



UConn IN THE MEDIA

2021

UConn

UConn Communications is raising the national reputation of UConn.

Our news and editorial team serves to spread the news of UConn's greatness outward, leveraging partnerships with local outlets and making big pitches to national media to attain coverage of UConn. Our spokespeople and editorial associates are the go-to sources of institutional information for journalists, answering their questions when news breaks and connecting reporters with faculty experts for features and in-depth stories.

University Communications and Social Media.

Since 2004, social media has become more integrated into everyone's daily lives. It has changed the way people get news, how people interact with each other, and provides a way to share user-generated content. Statistics from 2021 show that there are more than 4.4 billion social media users worldwide, with Gen Z surpassing millennials in daily use of social media platforms.

In 2021, students, faculty, and staff continued to stay connected through social media. In a time where UConn had in-person learning, but still had to stay physically distant, the UConn community heavily relied on social media to keep in touch, to organize, and to celebrate.

To continue elevating UConn's brand across social media, the social team continued to place a high priority on short, social video content and high-quality photography across all of UConn's platforms. Pivoting to a stronger vertical video strategy, the social team has been able to take advantage of Instagram Reels — a content format that allows users to create and share short engaging videos that, unlike Instagram Stories, don't disappear after 24 hours. The social team has also developed a TikTok strategy, which will be deployed in early 2022.

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Total followers: **499,580**

Our growth rate was 4.7% overall.

Total engagement: **1,299,872**

Engagements include likes, comments, reactions, link clicks, and shares on posts for Facebook, Twitter, Instagram, and LinkedIn.

Total impressions: **42,291,252**

An impression is when a post is visible in a social feed. This is how many times people saw UConn's content across Facebook, Twitter, Instagram, and LinkedIn.

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Total Facebook followers: **105,071**

Total Twitter followers: **104,424**

Total Instagram followers: **88,106**

Total LinkedIn connections: **199,770**

Total YouTube subscribers: **11,030**

FEATURED ON

The New York Times

EVERYDAY HEALTH

The Atlantic

salon

WALL STREET JOURNAL

THE HILL

AP

GLAMOUR

Chicago Tribune

Hartford Courant

INSIDE HIGHER ED

yahoo!

Forbes

Connecticut magazine

PsychCentral

TIME

The Washington Post

CT INSIDER

THE CONVERSATION

Newsweek

verywell health

U.S. News & WORLD REPORT

Psychology Today

healthleaders

the ct mirror

SCIENTIFIC AMERICAN

BF BUSINESS FACILITIES

TheScientist

Los Angeles Times

Entrepreneur

Healio

CNN

ScienceNews

HARTFORD BUSINESS JOURNAL

The Guardian

USA TODAY

THE CHRONICLE OF HIGHER EDUCATION

CR Consumer Reports

The Boston Globe

EducationWeek

Hartford MAGAZINE

HealthDay

BUSINESS INSIDER

EdTech Focus On Higher Education

HEARST

CONNECTICUT MEDIA GROUP

Rudd Center for Food Policy and Obesity

JUST 2% OF U.S. TEENS EAT RECOMMENDED AMOUNT OF VEGGIES

By Amy Norton

In findings that may ring true to parents, a new government survey shows that a paltry 2% of U.S. high school students are eating enough vegetables.

The study is the latest look at teenagers' eating habits by the U.S. Centers for Disease Control and Prevention. And experts described the results as "disappointing."

Of more than 13,000 high school students surveyed in 2017, only 2% were getting the minimum recommended allotment of veggies: 2.5 to 3 cups per day.

Fruit, meanwhile, was only mildly more popular. About 7% of high schoolers were getting enough, and 100% fruit juice counted toward those servings.

The figures show no progress since the CDC's previous report on the topic: In 2013, as well, 2% of high school kids were eating their veggies as recommended.

"The findings aren't necessarily surprising, but they are discouraging," said Marlene Schwartz, director of the Rudd Center for Food Policy and Obesity at the University of Connecticut, in Hartford.

There have been some positive policy moves in recent years, according to Schwartz, who was not involved in the study.

They include efforts to make fresh produce more accessible to low-income Americans through food stamps and the Women, Infants and Children (WIC) program. There are also rules around fruits and vegetables in the National School Lunch Program.

The problem is that relatively few high school students participate in lunch programs -- about 39%, according to the CDC. Instead, Schwartz said, they are free to bring lunch to school or go off-campus, often to fast-food places.

"Unfortunately, that leads to a decline in dietary quality," she said.

The findings, published Jan. 22 in the CDC's Morbidity and Mortality Weekly Report, paint a generally bleak dietary picture.

Vegetable intake was low across the board (among boys and girls, and white, Black and Hispanic teens). The median veggie intake was just one serving per day, which means half of the students ate even less.

The CDC said "new strategies," such as social media campaigns, are needed to coax kids into eating more healthfully.

Any strategies would be up against a powerful marketing campaign by food manufacturers.

And research shows that such marketing, via traditional ads and social media, undoubtedly gets kids -- and adults -- to eat processed foods.

"There's a reason companies spend all that money," Schwartz said.

In contrast, she added, "fresh fruits and vegetables aren't branded."

Then there are the economic factors. Despite nutrition-assistance programs, many families find fresh produce too expensive, Schwartz said. And if parents are not buying vegetables, kids won't develop an affinity for them.

"I think parents are doing the best they can, with the resources they have," Schwartz said.

Children do learn from parents' behavior, and eating habits are no exception, said Angela Lemond, a registered dietitian and spokeswoman for the Academy of Nutrition and Dietetics.

Lemond suggested that whenever possible, parents make fruits and vegetables easily accessible at home: Have vegetables cut up and on display in the refrigerator, so kids see them first when they're hunting for a snack.

"Children and teens are very visual, and when they're hungry, they want it to be quick and easy to eat," she said.

Lemond also suggested parents avoid labeling foods as "good" or "bad." Instead, consider certain foods to be

"always" on the menu -- that is, make fruits and vegetables part of every meal, she said. Other, less-healthy foods can go into the "sometimes" category.

Some kids do turn their noses up at vegetables, in particular. But it's easy to make them tastier, according to Lemond.

"The flavors of vegetables are enhanced when caramelized using olive oil with a splash of seasoning in the oven," she said.

"You can also get a grill basket and create a nice flavor using high-heat oils like avocado or sesame oil."

With older kids, it can be helpful to include them in the shopping and preparation, Schwartz said. Let them have a say in which vegetables will turn up on the dinner plate.

Ideally, children should be exposed to plenty of fruits and vegetables early in life.

"Exposure, and repeated exposure even after they reject foods, is important," Lemond said. "Just because they don't like a food once doesn't mean they won't tomorrow."

Her advice is to try cooking vegetables different ways, and to be patient.

"Pleasant approaches are the best way," Lemond said. ●

HOW CONNECTICUT'S SCHOOLS HAVE MANAGED TO MAINTAIN LUNCH DISTRIBUTION FOR KIDS WHO NEED IT MOST DURING THE COVID-19 PANDEMIC

By Marlene B. Schwartz

THE BIG IDEA

Connecticut schools ensured that low-income students were still getting enough to eat after the pandemic first shuttered buildings in March because of a swift shift in how staff prepared and distributed cafeteria food, according to an article we recently published in a peer-reviewed journal.

When the state's school buildings closed because of the COVID-19 pandemic in mid-March 2020, the estimated share of children facing economic hardship who received a school lunch quickly fell to 42% from 62%. But by April and May, Connecticut schools were serving about the same number of school lunches as they had served to low-income children during the same months the previous school year.

The initial decline put Connecticut's nearly 230,000 students who are eligible for free or reduced-price meals at a greater risk of not getting enough to eat. The state avoided this outcome because school food service staff members changed their preparation, packaging and distribution methods to feed students who were no longer eating in cafeterias.

My colleagues and I came to this conclusion after analyzing statewide meal-distribution data from 120 districts and conducting extensive interviews with food service directors from eight school systems around Connecticut. The food service directors were selected to represent urban, rural and suburban districts from different regions of the state.

Most Connecticut school districts established “grab-and-go” distribution at their shuttered school buildings once they switched to virtual learning. We also heard about rural districts employing bus drivers to deliver meals to students’ homes. Some districts made an effort to establish food-distribution sites at community centers, libraries, fire departments and child care centers near where low-income students live.

Trial and error was the rule. Most districts began by adjusting staffing and schedules, as well as the number of distribution sites and their locations. They needed to experiment at first with packaging materials to ensure meals were portable, safe and ready to reheat. We heard from many sources that communication with families was crucial, since it was important to let everyone know when and where meals would be available and what was on the menu. Schools used every channel available – email, robocalls, social media, text messages and websites. One local food service director had staff personally call families. Others had principals record messages or local clergy do outreach. Everything needed to be translated into Spanish to reach all families. And undocumented parents needed to be reassured that no one was checking for immigration status at the distribution sites.

The food service directors said that these efforts all helped to increase participation.

WHY IT MATTERS

One consequence of the COVID-19 pandemic has been the increase in food insecurity, the technical term for the inability to get enough food for financial or logistical reasons. According to a recent survey, 10% to 15% of adults living with children said their children either sometimes or often didn’t eat enough in the previous week because they couldn’t afford enough food. Research has shown that the National School Lunch Program, which funds these meals, reduces food insecurity and improves student nutrition.

WHAT STILL ISN’T KNOWN

The meal distribution data and interviews generated a snapshot of how Connecticut initially tackled this challenge. We still don’t know which strategies made the biggest difference, and which have continued to be used across the state or nation. Research on the impact

of keeping up free school meals on child food insecurity rates during the pandemic, as well as other health and academic outcomes, will be important.

A careful evaluation of the innovation taking place in the 2020-2021 school year may yield ideas on how to improve school meals in the long term. ●

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‘IN OBESITY RESEARCH, FATPHOBIA IS ALWAYS THE X FACTOR

Contrary to what you’ve undoubtedly been told, you can be fat and fit at the same time

By Virginia Sole-Smith

“Tell me what I’m missing,” my husband said. He, like many of us, had seen headlines about a recent study that surveys the weight, exercise habits and cardiovascular disease risk of over half a million people in Spain. It’s being covered by media outlets as irrefutable proof that no, sorry, forget what the body positivity movement has told you—you cannot be both fat and fit. This is not a new argument. It’s the comment made on every story I write, as a journalist who covers weight stigma (negative beliefs about large bodies that lead to discrimination against fat people). But in a burst of good news for internet trolls, the authors of this new study, who published their findings as a research letter in the *European Journal of Preventive Cardiology*, drew this same conclusion because the people in their study with high BMIs had a higher risk of diabetes, hypertension and high cholesterol than the people with body mass index scores in the normal range.

This relationship stood even when people in bigger bodies exercised regularly. Therefore, “weight loss per se should remain a primary target for health policies aimed at reducing CVD risk in people with overweight/obesity,” the researchers wrote. So, what’s missing from that conclusion, and this argument more broadly? Any acknowledgment of the way weight

stigma (also known as fatphobia) impacted the study's design, the health of the participants, and our entire understanding of weight and health.

Let's start by noting that these conclusions contradict several other recent pieces of research. A 2017 study published in the same journal followed 5,344 Dutch people over the age of 55 for 15 years and found that folks with high BMIs who also had high levels of physical activity showed no increased risk for heart disease compared to equally active people with normal BMIs. An analysis of data on 22,476 Americans aged 30 to 64 published in 2020 found that being physically active was associated with a larger reduction in a person's 10-year heart disease risk than having a normal BMI. Both of these studies affirm the conclusion drawn in a 2014 meta-analysis of 10 studies that when it comes to mortality risk, fitness matters more than fatness.

But when researchers talk about these findings, they call them "the obesity paradox," because it's so startling to see fat people not dying of heart disease like we're always told they will. "The term 'obesity paradox' is a prime example of weight stigma in the scientific literature," Jeffrey Hunger, an assistant professor of social psychology at Miami University of Ohio told me when I wrote about medical weight stigma for the July 2020 issue of *Scientific American*. "Think about it: A paradox is something contradictory or seemingly absurd. This term came about because it was considered absurd that fat people could actually be healthy."

Weight stigma also shows up in the questions that researchers don't ask. In the new study, researchers took the participants' weight and health histories from medical records and asked them to self-report their activity levels. They did not track other established risk factors for heart disease, like diet and smoking history. And they did not ask any of the participants whether the doctors examining them displayed signs of weight bias, even though we know from other research that many doctors discriminate against patients in large bodies.

In one survey, 24 percent of physicians admitted they were uncomfortable having friends in larger bodies, and 18 percent said they felt disgusted when treating a patient with a high BMI. You are unlikely to improve the health of someone you find repulsive, and indeed, we see that doctors tend to undertreat, overtreat or even

misdiagnose patients in bigger bodies, confusing tumors for fatness. And fat people are more likely to avoid medical care when they know they'll be treated badly, which means they are often sicker and harder to treat by the time they do see a doctor.

The researchers also did not ask their high-weight participants how the experience of fatphobia impacts their ability to be physically active in the first place. Can they find workout clothes that fit? Can they go to their local gym, or for a walk in the park, without fear of harassment? In her memoir *Happy Fat*, comedian Sofie Hagen recalls standing in a changing booth at her gym for 45 minutes, working up the courage to walk to the pool in her swimsuit and endure the stares of other slimmer swimmers. "Gyms are for thin people, staying home and eating chips is for fat people," she writes. "So for a fat person, going to a gym, or running in the park, or doing exercise in a place with people, can be anxiety-inducing because you are so on display doing something that is considered uncharacteristic."

Last, the researchers did not consider whether the increased risk for heart disease found in their fat-yet-active subjects might be due to the experience of living in that fat body, rather than the fat itself. A 2016 analysis of data collected from over 21,000 Americans found a significant association between a person's experience of weight stigma and an increased incidence of heart disease, stomach ulcers, diabetes and high cholesterol even after researchers controlled for their subjects' socioeconomic status, physical activity level and BMI. Other studies have shown that experiencing weight stigma consistently raises our cortisol levels and other physiological stress responses, which are tied to negative health outcomes.

But here's something the Spanish researchers find, despite their conclusion that you can't be fat and fit: Being physically active reduced a person's risk of heart disease compared to the less active people in their same weight class. So, a fat person who exercises may still be more likely to get diabetes or high blood pressure than a thin person, but the gulf is less enormous. (In fact, the study found that active people in the overweight BMI range had roughly the same risk for hypertension as inactive people in the normal BMI range.) More importantly, active fat people are less likely to get those conditions than if they didn't exercise at all. This means that you can still improve your health through physical activity even if you don't get skinny in

the process. Which you probably won't; that's why so many of us have likely abandoned New Year's weight loss resolutions. "To give the impression that changing your weight status from obese to overweight or normal weight is this straightforward, easy thing to do is to effectively ignore 50 years of research," says Marlene B. Schwartz, director of the Rudd Center for Food Policy and Obesity at the University of Connecticut.

That research usually gets ignored because weight loss sells. The diet industry was valued at \$192.2 billion in 2019, according to a report by Allied Market Research. Weight loss pharmaceuticals alone accounted for nearly \$1.7 billion last year, according to another recent report. These industries, along with food manufacturers, have long funded much of the science that gets done on weight and health. And independent reviews, including a 2018 meta-analysis, have found that industry sponsorship influences research agendas. '

The National Institutes of Health's decision in June 1998 to expand the obese and overweight categories on the body mass index to include 29 million more Americans preceded the FDA approval of two popular weight loss drugs, Orlistat and phentermine. In February, researchers at Northwestern University reported findings that semaglutide, a medication taken as a weekly injection, resulted in significant weight loss. The drug is currently marketed at a lower dose as a diabetes treatment and retails for around \$1,000 a month; its potential for profit as a diet drug is enormous, especially because patients will have to take it for the rest of their life to avoid regaining weight.

When we define health and fitness exclusively through the prism of someone's pants size, we ignore the myriad of other measurements that matter more. Exercising regularly can build strength and flexibility, while reducing symptoms of anxiety and depression, and it improves biomarkers of health like blood pressure and cholesterol—and that's just the start of the list. If people feel like they've failed at exercise because they didn't also get smaller, they'll miss out on all of its other benefits. And when obesity researchers and doctors keep pushing people towards weight loss as our "primary target" for health, what they're really saying is that those other health benefits don't matter; that our bodies will never be good enough; that we'll never be good enough—unless we get thin. When researchers—or doctors or your mother or internet trolls—say "you can't be fat and fit," what they really

mean is, "you can't be fat and thin." This is true. But it also shouldn't be the goal. ●

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MICHELLE OBAMA'S 'PASS THE LOVE' CAMPAIGN TO DISTRIBUTE ONE MILLION MEALS

The food service organization Genuine Foods will source and assemble the campaign's meal boxes, which will then be distributed by local nonprofits in various cities.

By Haleluya Hadero

Michelle Obama is launching a nonprofit campaign that aims to provide more than 1 million meals to food-insecure families in connection with the debut Tuesday of her children's food show on Netflix.

The "Pass the Love w/ Waffles + Mochi" initiative, named after the new series "Waffles + Mochi," is a collaborative campaign by the nonprofit Partnership for a Healthier America, its honorary chair Obama and Higher Ground Productions, the production company owned by the former first lady and her husband, former President Barack Obama.

The nonprofit says the campaign was inspired by the series, which tells the story of two puppet friends who "travel the world exploring the wonders of food and culture while learning how to cook with fresh ingredients."

Walmart and Blue Apron have jumped in to support the initiative, which also aims to "leverage the show, its characters, and Mrs. Obama to meaningfully shift our food culture toward more affordable, fun, at-home meals for families of every income level," according to the nonprofit.

PHA President and CEO Nancy Roman told The Associated Press that the two companies will contribute funds to the campaign and raise money for it among

their customers. More than half the money is expected to come from the public, Roman says.

The nonprofit was created in conjunction with Michelle Obama's Let's Move! effort in 2010. The former first lady, who has long been a champion of healthy eating, said in the announcement last week that the idea is to "help make sure families all over the country can access fresh, nutritious food" amid the devastating impacts of the coronavirus pandemic.

The U.S. has seen a significant rise in hunger during the virus outbreak. One estimate from the organization Feeding America says around 45 million Americans in 2020 may have experienced food insecurity — limited or uncertain access to adequate food — compared with 35 million in 2019.

Caitlin Caspi, a University of Connecticut professor who studies food insecurity, says the rise in unemployment, the closure of schools and disruptions across food systems — like shortages of staple foods in the early days of the pandemic — all played a factor in the increase. And many, left with little options, turned to food banks for help.

The issue has been "most pronounced among households with children, and in particular, households with children of color," Caspi said.

"Meal boxes that provide fresh food and a complete set of ingredients to households are one way to reduce the impact of these food access disruptions, and to get healthy meals on the table," she added.

The food service organization Genuine Foods will source and assemble the campaign's meal boxes, which will then be distributed by local nonprofits in various cities. Roman says they will begin to roll out the campaign in cities that have the highest child poverty rates as the funds are raised.

The rollout will start in May, Roman says, and continue throughout the year. Each city deployment is expected to take place over four weeks.

"We're thinking of a pace of about two a month," Roman said. But, she added, "It will depend in part on how the campaign is going." ●

OBESITY COSTS THE AVERAGE U.S. ADULT ALMOST \$1,900 PER YEAR: STUDY

By Amy Norton

For people who are obese, even a small amount of weight gain may come with higher medical costs, a new study finds.

It's well known that obesity contributes to health conditions like arthritis, diabetes, heart disease and certain cancers -- and health care costs reflect that.

But the new study dug a little deeper into the connection between weight and medical costs. Overall, health care costs for obese adults were nearly \$1,900 higher each year, compared to their normal-weight peers. And once adults were in the "obese" category, even incremental increases in weight meant additional health care expenses, the researchers found.

The findings, based on nearly 180,000 Americans, sound like bad news.

Viewed a different way, though, they also suggest that small improvements in weight could save health care dollars.

"You could see this as glass half-full, half-empty," said Marlene Schwartz, director of the Rudd Center for Food Policy and Obesity at the University of Connecticut.

"On one hand, it's not just categorical shifts in BMI that increase health care costs -- it's small shifts, too," said Schwartz, who was not involved in the study.

"On the other hand," she added, "that suggests even small improvements in BMI could make a difference."

BMI, or body mass index, is a measure of weight in relation to height. It's often described in terms of categories: A BMI of 30 to 34.9 is the "obesity class I" category, 35 to 39.9 is "class II," and a BMI of 40 or higher is "class III" or "severe" obesity.

In this study, once people reached a BMI of 30, even a one-unit increase caused annual health care expenses to creep up -- by an extra \$253 per person.

Not surprisingly, severe obesity carried the heaviest price tag -- costing an additional \$3,100 per person, versus Americans with a normal BMI.

Still, study leader Zachary Ward agreed that the findings can be seen in a positive light.

Even if obese adults cannot lose a substantial amount of weight -- a difficult feat, Ward noted -- there could be benefits from modest weight loss, or even from preventing further weight gain.

"If people can maintain their current weight as they age, that might avert some of these extra health care costs," said Ward, a research scientist at the Harvard School of Public Health.

The study, published March 24 in the journal PLOS ONE, comes at a time of soaring obesity rates among Americans. As of 2018, more than 42% of U.S. adults were obese, according to the U.S. Centers for Disease Control and Prevention. That was up from 30% about 20 years ago.

Just over 9% of adults are severely obese, the agency says.

The latest findings are based on more than 175,000 adults and children who took part in one of two federal health surveys.

Overall, Ward's team calculates, adulthood obesity accounted for nearly \$173 billion in annual medical expenses nationally.

In general, obesity-related health care costs were greatest for people in their 60s, Ward said. But, he added, obesity in kids and young adults is a concern, in part, because they are likely to be obese as they grow older.

Ward said childhood is an ideal time for prevention -- both because the earlier, the better, and because it's generally easier for programs to reach children.

Schwartz agreed. "It's so important to focus on good nutrition in childhood," she said. "And it's an area that government can regulate."

Schwartz pointed to efforts to make fresh produce and other healthy foods more accessible to low-income

Americans, through the Food Stamp and Women, Infants and Children programs. The National School Lunch Program also has updated its nutrition standards to boost kids' fruit and vegetable intake.

But it's also never too late for adults to make diet changes or start exercising. It is an uphill battle, Schwartz noted, and as people age, they are fighting the natural slowdown in metabolism.

As the latest findings suggest, though, even preventing further weight gain -- particularly the slide into severe obesity -- can be considered a win.

"Every step in the right direction counts," Schwartz said.

But for individuals to succeed, she noted, they need help. When healthy choices are made easier -- a workplace with fruits and vegetables rather than vending machines full of junk food, for example -- people will respond, Schwartz said. ●

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ON APRIL 20, 2021

WHY IT'S GOOD FOR KIDS TO HAVE FRIENDS FROM DIFFERENT SOCIOECONOMIC BACKGROUNDS

By Leah M. Lessard and Jaana Juvonen

THE BIG IDEA

Friendships that bridge across social class -- "cross-class friendships" -- can minimize middle school academic achievement differences that are based on the level of parents' education, according to research from the UCLA School Diversity Project.

As scholars of adolescent development, we examined academic achievement differences among 4,288 middle school students in California based on their parents' education level.

Seventeen percent of parents or guardians of students in our sample did not receive a high school diploma,

12% had a high school diploma or equivalent, 28% attended some college, 23% had a four-year college degree and 20% had a graduate degree.

Students' academic achievement was assessed using GPAs, scores from the state standardized test, and academic engagement as reported by teachers in the sixth grade and again the following year.

To assess cross-class friendships, students listed the names of their good friends in their grade and we compared the parental education levels of mutual friends. About half of all students in the sample had at least one cross-class friendship in sixth grade.

Consistent with past research, when students did not have cross-class friends, we found that academic achievement tended to be lower among students whose parents had no college diploma relative to students whose parents had a college degree.

However, some achievement differences were reduced with cross-class friendship. For example, grades, standardized test scores and academic engagement did not differ among students whose parents had a high school versus college diploma when these students had at least one cross-class friend.

WHY IT MATTERS

Friendships are often left out of the conversation when scholars and schools think about how to improve student performance. But teens can gain valuable knowledge and know-how from their friends, including homework assistance and study strategies.

Our results suggest cross-class friendships may in part help level the academic playing field during the middle school years, when socioeconomic achievement disparities can widen. Middle school is also a time when preteens and teens become increasingly independent from their parents and rely more on friends.

Our data do not tell us why cross-class friendships may function as an academic equalizer. But it is possible that when teens from different socioeconomic backgrounds become friends, they learn from one another new insights and valuable skills that can support academic success.

WHAT STILL ISN'T KNOWN

It's important to recognize that several of these achievement differences did not vary with cross-class friendship. For example, achievement differences among students whose parents did not have a high school diploma and those whose parents had a college degree were not altered by cross-class friendship. Further studies are needed to investigate why this may be.

Based on current findings, we also do not know how cross-class friendship may diminish achievement differences. For example, one question to consider is whether they create more opportunities for young people to talk about their study strategies and homework approaches.

And, given our focus on middle school, we do not know whether our findings extend to elementary or high school. ●

WHAT'S NEXT

Some of the next steps for our work include focusing on how schools shape students' ability to form and maintain cross-class friendships.

Just as greater school ethnic diversity has been shown to promote the formation of cross-ethnic friendships, school socioeconomic diversity likely facilitates cross-class friendships. That is, when students from different backgrounds share classes, they are more likely to become friends.

We believe investigating this topic is critical in light of increasing socioeconomic segregation in U.S. public schools, which may constrain opportunities for students to engage in friendships with peers from different backgrounds and contribute to achievement gaps.

We also hope to investigate possible social outcomes associated with cross-class friendship. For example, just as cross-ethnic friendships improve attitudes toward other ethnic groups, cross-class ties, we believe, may play a critical role in reducing negative class-based stereotypes and promoting mutual understanding among young people from different socioeconomic backgrounds. ●

WEIGHT STIGMA IS A BURDEN AROUND THE WORLD – AND HAS NEGATIVE CONSEQUENCES EVERYWHERE

By Rebecca Puhl

“Lazy. Unmotivated. No self-discipline. No willpower.

These are just a few of the widespread stereotypes ingrained in American society about people who have a higher body weight or larger body size. Known as weight stigma, these attitudes result in many Americans being blamed, teased, bullied, mistreated and discriminated against.

There is nowhere to hide from societal weight stigma. Decades of research confirm the presence of weight stigma in workplaces, schools, health care settings, public accommodations and the mass media, as well as in close interpersonal relationships with friends and families. It’s everywhere.

I’m a psychologist and researcher at the Rudd Center for Food Policy & Obesity at the University of Connecticut. For 20 years my team has studied weight stigma. We’ve examined the origins and prevalence of weight stigma, its presence across different societal settings, the harm it causes for people’s health and strategies to tackle this problem.

We conducted a recent international study that clearly shows that weight stigma is widespread, damaging and difficult to eradicate. This societal devaluation is a real and legitimate experience for people across different countries, languages and cultures.

A PERSISTENT AMERICAN BIAS

Among U.S. adults, weight stigma is a common experience, with as many as 40% reporting past experiences of weight-based teasing, unfair treatment and discrimination. These experiences are most

prevalent for people with high body mass indexes or those with obesity and for women. For youth, body weight is one of the most prevalent reasons for teasing and bullying.

The fact that more than 40% of Americans have obesity has not softened public attitudes toward people in this group. Although societal attitudes toward other stigmatized groups have become less prejudiced in recent decades, there has been little change in weight bias. In some cases it’s worsening.

Prevailing views that people are personally responsible for their weight, despite ample scientific evidence of the complex and multifactorial causes of obesity, are one reason why weight stigma persists. This mindset is difficult to change given American culture’s celebration of thinness, negative media portrayals of people with larger bodies and a thriving diet industry. These factors reinforce the faulty premise that body weight is infinitely malleable, as does a lack of legislation to protect people from weight discrimination.

Contrary to public perceptions, weight stigma does not motivate people to lose weight. Instead it worsens health and reduces quality of life. The harmful impacts of weight stigma can be real and long-lasting. They range from emotional distress – depressive symptoms, anxiety, low self-esteem – to disordered eating, unhealthy eating behaviors, lower physical activity, weight gain, increased physiological stress and avoiding health care.

A SHARED STRUGGLE

Weight stigma is not unique to America. It exists around the world. However, few studies have directly compared people’s experiences of weight stigma in different countries.

In our recent study, we compared experiences of weight stigma in six nations: Australia, Canada, France, Germany, the U.K. and the U.S. These countries share similar societal values that reinforce personal blame for body weight, and do little to challenge weight-based shaming and mistreatment. The participants were 13,996 adults (around 2,000 people per country) who were actively trying to manage their weight.

The biases people encountered because of their higher weight or larger body size turned out to be remarkably consistent across the six countries, with more than half

of study participants – 58% on average – experiencing weight stigma. The most common interpersonal sources of weight stigma were family members (76%-87%), classmates (72%-76%) and doctors (58%-73%). These experiences were most frequent and distressing during childhood and adolescence.

Many incorporated these stigmatizing experiences into how they felt about themselves. In this process of “weight bias internalization,” people apply negative societal stereotypes to themselves. They blame themselves for their weight and judge themselves as inferior and deserving of societal stigma.

We knew from our earlier research that weight bias internalization has harmful health implications, and this was true here as well. Across the six countries, the more that people internalized weight bias, the more they gained weight in the prior year, used food to cope with stress, avoided going to the gym, had an unhealthy body image and reported higher stress. These findings persisted regardless of people’s body size or their previous experiences of stigma.

Moreover, in all six countries people with greater internalized weight bias reported worse health-related quality of life and health care experiences. They avoided getting health care, had less frequent checkups and reported more substandard health care compared to people who had less internalization.

The unique multinational perspective of our study reveals that weight stigma is commonly experienced, often internalized and related to poor health and health care among people who are trying to manage their weight. In this sense, confronting weight stigma appears to be a collective struggle, but it’s one that people are likely grappling with on their own.

REASONS FOR OPTIMISM

While there is a long road ahead to eliminate weight stigma, shifts in societal attitudes are taking place. In recent years, the harms of “fat shaming” have received increased public attention, and so has the body positivity movement. Both are helping to elevate calls for efforts to stop unfair treatment based on weight.

There is also growing recognition in the medical community that action is needed. In 2020, more than 100 medical and scientific organizations across nine countries signed a joint international consensus

statement and pledge to bring attention to weight stigma and its harmful impact. These medical experts aim to shift the narrative of blame and help address weight stigma in media, public attitudes and health care.

Our research shows broad and substantial public support for policies to tackle weight discrimination. In a series of national studies, we found that more than 70% of Americans support adding body weight as a protected category, alongside categories like race and age, to existing state civil rights laws. They also support new legislation to make it illegal for employers to discriminate against employees based on weight.

This would legitimize weight stigma as both a social injustice and a public health issue.

I believe broad and collective action is needed to address this problem, both in and outside the U.S. While this may sound challenging, fundamentally it is actually quite simple: it’s about respect, dignity and equal treatment for people of all body weights and sizes. ●

THIS ARTICLE WAS FIRST PUBLISHED IN CNN
ON JUNE 7, 2021

THE PANDEMIC CHANGED THE WAY WE ATE AND SHOPPED -- NOT ALWAYS FOR THE BETTER

By Sandee Lamotte

The changes were not always for the better, according to a series of reports presented Monday at the annual meeting of the American Society of Nutrition.

INCREASE IN JUNK FOOD INTAKE

An analysis by the US Centers for Disease Control and Prevention found some of us increased our consumption of unhealthy snacks and desserts, including chips, cookies and ice cream, while also guzzling more sugary drinks such as sweetened coffee

and teas, regular sodas, fruit drinks, and sports or energy drinks.

Over a third (36%) of the nearly 4,000 Americans who were surveyed in June 2020 reported sometimes consuming more unhealthy snacks and desserts than before the pandemic, while 22% said they sometimes drank sugary drinks.

However, 16% said they ate snacks and sweets often or always, while 10% said the same of sugary beverages. People who reported consuming the most unhealthy foods and drinks were more likely to identify as Hispanic or Black and be younger than age 65, obese, female, and of lower income and education levels.

The same survey also asked about food availability and safety. Nearly 6 in 10 people -- predominately lower-income, unemployed, Black or Hispanic adults -- said they were worried about not being able to obtain food at nearby stores or were concerned they might catch Covid-19 from food. Early fears that Covid-19 could be spread via food packaging were quickly discounted by scientists.

These findings "highlight the importance of strategies and communications that reduce fears and prevent unintended negative behaviors," such as food hoarding and panic buying, said dietitian Brianna Dumas, a fellow in the CDC's Research Participation Program, in an abstract.

In addition, public health officials should stress "consumer awareness of food access options during emergencies, including promotion of hunger safety net programs, especially among disproportionately affected groups," Dumas said.

A DROP IN HEALTHY FOODS

Another study analyzed the diets of more than 2,000 Americans before and during the pandemic and found a decrease in the consumption of healthy foods, including vegetables and whole grains, during the past year.

"This decrease was the most pronounced among women, black and Latino study participants, and participants who gained at least five pounds or more since 2018," said Caroline Um, a postdoctoral fellow at the American Cancer Society, in a statement.

Um plans to follow study participants to understand how their diets might continue to change. Other studies

will investigate which factors, such as mental health or financial stressors, might be involved in the change in eating behaviors.

KIDS GAINED WEIGHT

Nearly 30% of 433 parents surveyed by researchers at Virginia Commonwealth University said their child had gained an average of 9.6 pounds in the months between May and September of 2020.

Parents of children between 5 and 18 years old were questioned before the pandemic and again in May and September of 2020 about their concerns regarding their child's weight.

Families who said their child gained weight during that time period were concerned about that trend and attempted to monitor and restrict their child's eating habits in both May and September. However, in families where children did not gain weight, parents were initially concerned and monitored their child's food intake in May, but had stopped doing so by September.

Further research is needed to investigate and target the "different behavioral, societal, environmental, and psychosocial factors" that might contribute to weight gain among children and adolescents, wrote Melanie Bean, an associate professor of pediatrics and co-director of the Healthy Lifestyles Center at Children's Hospital of Richmond at Virginia Commonwealth University, in an abstract.

TEASING PEOPLE ABOUT THEIR WEIGHT

Another study presented at the conference looked at the impact on children when family members teased them or made other critical comments about their weight. Researchers from Tufts University found that exposure to negative family comments about weight "as little as 3 times per month was significantly associated with moderate to high levels of weight bias internalization," according to the study.

Prior research has shown that when children and adults experience weight stigma and internalize it, that itself can predict weight gain.

"A common perception is that a little shame or stigma might motivate people to lose weight, but that is not what we see in research," Rebecca Puhl, deputy director

at the Rudd Center for Food Policy and Obesity at the University of Connecticut, told CNN in a prior interview.

"In fact, when people experience weight stigma, this actually contributes to unhealthy eating behaviors, lower physical activity and weight gain," Puhl said. "Our studies show that when parents shift the conversation to healthy behaviors, that tends to be much more effective.

"The focus isn't on the number on the weight scale, but on the whole family eating fruits and vegetables, replacing soda with water, getting daily physical activity," she added.

ONLINE GROCERY SHOPPING

A study done in the early days of the pandemic -- March and April of 2020 -- found that a third of the nearly 18,000 households surveyed said they were shopping online for groceries, and, of those, 60% said they planned to continue to do so after the pandemic passed.

Their top reasons? Over 80% said it was to "avoid public germs and Covid-19," while 44% wanted to "take advantage of the convenience," according to Shu Wen Ng, an associate professor in the Department of Nutrition at the University of North Carolina at Chapel Hill.

HIGHER FOOD PRICES IN AREAS WITH HIGHER RESTRICTIONS

Researchers from Tufts University's Friedman School of Nutrition Science and Policy analyzed retail prices for food and other consumer goods in 133 counties in the United States and compared them to the levels of Covid-19 restrictions imposed by local governments.

Results showed that a higher level of government restrictions during the pandemic was associated with higher food prices, but did not affect the cost of other consumer goods. ●

WEIGHT STIGMA STUDY IN THE U.S. AND 5 OTHER NATIONS SHOWS THE WORLDWIDE PROBLEM OF SUCH PREJUDICE.

Lazy. Unmotivated. No self-discipline. No willpower.

By Rebecca Puhl

These are just a few of the widespread stereotypes ingrained in American society about people who have a higher body weight or larger body size. Known as weight stigma, these attitudes result in many Americans being blamed, teased, bullied, mistreated and discriminated against.

There is nowhere to hide from societal weight stigma. Decades of research confirm the presence of weight stigma in workplaces, schools, health-care settings, public accommodations and the mass media, as well as in close interpersonal relationships with friends and families. It's everywhere.

I'm a psychologist and researcher at the Rudd Center for Food Policy and Obesity at the University of Connecticut. For 20 years, my team has studied weight stigma. We've examined the origins and prevalence of weight stigma, its presence across different societal settings, the harm it causes for people's health and strategies to tackle this problem.

We conducted a recent international study that clearly shows that weight stigma is widespread, damaging and difficult to eradicate. This societal devaluation is a real and legitimate experience for people across different countries, languages and cultures.

Among U.S. adults, weight stigma is a common experience, with as many as 40 percent reporting past experiences of weight-based teasing, unfair treatment and discrimination. These experiences are most prevalent for people with high body mass indexes or those with obesity and for women. For youth, body

weight is one of the most prevalent reasons for teasing and bullying.

That more than 40 percent of Americans have obesity has not softened public attitudes toward people in this group. Although societal attitudes toward other stigmatized groups have become less prejudiced in recent decades, there has been little change in weight bias. In some cases it's worsening.

Prevailing views that people are personally responsible for their weight, despite ample scientific evidence of the complex and multifactorial causes of obesity, are one reason weight stigma persists. This mind-set is difficult to change given American culture's celebration of thinness, negative media portrayals of people with larger bodies and a thriving diet industry. These factors reinforce the faulty premise that body weight is infinitely malleable, as does a lack of legislation to protect people from weight discrimination.

Contrary to public perceptions, weight stigma does not motivate people to lose weight. Instead it worsens health and reduces quality of life. The harmful impacts of weight stigma can be real and long-lasting. They range from emotional distress — depressive symptoms, anxiety, low self-esteem — to disordered eating, unhealthy eating behaviors, lower physical activity, weight gain, increased physiological stress and avoiding health care.

Weight stigma is not unique to America. It exists around the world. But few studies have directly compared people's experiences of weight stigma in different countries.

In our recent study, we compared experiences of weight stigma in six nations: Australia, Canada, France, Germany, the United Kingdom and the United States. These countries share similar societal values that reinforce personal blame for body weight, and do little to challenge weight-based shaming and mistreatment. The participants were 13,996 adults (about 2,000 people per country) who were actively trying to manage their weight.

The biases people encountered because of their higher weight or larger body size turned out to be remarkably consistent across the six countries, with more than half of study participants — 58 percent on average — experiencing weight stigma. The most common interpersonal sources of weight stigma were family

members (76-87 percent), classmates (72-76 percent) and doctors (58-73 percent). These experiences were most frequent and distressing during childhood and adolescence.

Many incorporated these stigmatizing experiences into how they felt about themselves. In this process of "weight bias internalization," people apply negative societal stereotypes to themselves. They blame themselves for their weight and judge themselves as inferior and deserving of societal stigma.

We knew from our earlier research that weight bias internalization has harmful health implications, and this was true here as well. Across the six countries, the more that people internalized weight bias, the more they gained weight in the prior year, used food to cope with stress, avoided going to the gym, had an unhealthy body image and reported higher stress. These findings persisted regardless of people's body size or their previous experiences of stigma.

Moreover, in all six countries people with greater internalized weight bias reported worse health-related quality of life and health-care experiences. They avoided getting health care, had less frequent checkups and reported more substandard health care compared to people who had less internalization.

The unique multinational perspective of our study reveals that weight stigma is commonly experienced, often internalized and related to poor health and health care among people who are trying to manage their weight. In this sense, confronting weight stigma appears to be a collective struggle, but it is one that people are probably grappling with on their own.

While there is a long road ahead to eliminate weight stigma, shifts in societal attitudes are taking place.

In recent years, the harms of "fat shaming" have received increased public attention, and so has the body positivity movement. Both are helping to elevate calls for efforts to stop unfair treatment based on weight.

There is also growing recognition in the medical community that action is needed.

In 2020, more than 100 medical and scientific organizations across nine countries signed a joint international consensus statement and pledge to bring attention to weight stigma and its harmful effect. These

medical experts aim to shift the narrative of blame and help address weight stigma in media, public attitudes and health care.

Our research shows broad and substantial public support for policies to tackle weight discrimination. In national studies, we found that more than 70 percent of Americans support adding body weight as a protected category, alongside categories such as race and age, to existing state civil rights laws. They also support new legislation to make it illegal for employers to discriminate against employees based on weight.

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I believe broad and collective action is needed to address this problem, both in and outside the United States. While this may sound challenging, fundamentally it is actually quite simple: It is about respect, dignity and equal treatment for people of all body weights and sizes. ●

THIS ARTICLE WAS FIRST PUBLISHED IN THE MEDICINENET
ON JUNE 17, 2021

FAST-FOOD COMPANIES SPENDING MORE ON ADS AIMED AT YOUTH

By Robert Preidt

The U.S. fast-food industry has boosted spending on ads targeting kids, especially Black and Hispanic youth, new research shows.

For the study, the researchers analyzed data on ad spending and TV ad exposure for 274 fast-food restaurants and found that annual spending hit \$5 billion in 2019, up more than \$400 million between 2012 and 2019.

"Fast-food consumption by children and teens has increased over the past decade, and fast-food advertising definitely plays a role in that rise," said study co-author Jennifer Harris. She is senior research advisor for marketing initiatives at the University of Connecticut's Rudd Center for Food Policy and Obesity, in Hartford.

In 2019 alone, 2- to 5-year-olds saw an average 830 fast-food TV ads; 6- to 11-year-olds saw 787 ads; and 12- to 17-year-olds saw 775 ads, her team reported.

Just 1% of the ads promoted healthy menu choices. The rest touted full-calorie menu items or the restaurants in general.

Only 10% of the ads kids saw appeared during children's TV programming, and fewer than 10% promoted kids' meals, the researchers found. Many ads touted mobile apps or websites for digital orders.

Ads on both Spanish-language and Black-targeted TV programming increased dramatically over the study period, the findings revealed. Fast-food ad spending on Spanish-language TV rose 33% between 2012 and 2019. In 2019, Black youth saw 75% more fast-food ads than white youth did, up from a 60% difference in 2012.

On both Spanish-language and Black-targeted TV programming, fast-food ads more often featured low-cost, large-portion menu items and meal deals versus other offerings. No healthy menu items at all were advertised on Spanish-language TV, according to the report.

The findings were published June 17 on the center's FACTS website. FACTS is an acronym for Food Advertising to Children and Teens Score.

"Our findings show that these advertisements disproportionately target Black and Hispanic youth, groups who already face greater risk for obesity and other diet-related diseases," Harris said in a university news release.

"Moreover, many fast-food companies tout recent introductions of healthier menu items as evidence of their commitment to improving nutrition, but they rarely promote these items in their advertising," she added.

More than one in three kids eat fast-food on any given day in the United States.

Study co-author Frances Fleming-Milici, director of marketing initiatives at the Rudd Center, said less time in front of TV screens is not protecting kids from fast-food advertising.

"Now more than ever parents need support in raising healthy children, and consistent exposure to ads featuring burgers, fries and pizza sabotages their best

efforts," Fleming-Milici said. "Media companies, policymakers and advocates can play a vital role in demanding an end to irresponsible advertising."

The authors called on fast-food companies to limit such marketing voluntarily. Some suggested steps include putting restrictions on advertising of unhealthy foods to kids under age 14, as well as that targeting Hispanic and Black youth. ●

THIS ARTICLE WAS FIRST PUBLISHED IN THE CONVERSATION
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PANDEMIC HAS TEENS FEELING WORRIED, UNMOTIVATED AND DISCONNECTED FROM SCHOOL

By Leah M. Lessard

When the COVID-19 pandemic started, many U.S. teens were more worried about the disruption to their education than the possibility of getting sick. A May 2020 survey of high school students found that they reported academics and work habits to be among their biggest challenges, ahead of mental and physical health. Nearly three-quarters (72%) indicated they were "very much" concerned with how COVID-19 would impact their school year.

As a researcher who studies adolescent development, I was interested in whether and how teens' school stress changed as the pandemic dragged on. So during the fall of 2020, my colleague and I surveyed adolescents about their academic concerns and the changes they noticed in school social dynamics.

Our study, published in *School Psychology*, revealed that some school challenges increased, while others stayed about the same.

EDUCATION CONCERNS

The 452 adolescents, aged 11-17, that we surveyed reported that they still worried about how COVID-19 would impact their schoolwork. And concerns about

academic motivation were most common. Teens most frequently worried about not being able to motivate themselves to do, or focus on, schoolwork.

We bring the expertise of academics to the public.

These academic worries were elevated among older students who were further along in secondary school, for whom graduation and college planning are more imminent.

While our study did not collect academic achievement data, links between school stress and poorer academic outcomes highlight the importance of alleviating students' academic worries in order to reduce potential pandemic-related learning loss.

LESS SUPPORT FROM TEACHERS

In the early months of the pandemic, nearly one in four teens said they connected with teachers less than once a week after in-person school activities were canceled. We found this limited communication with teachers persisted into the 2020-2021 school year.

In fact, nearly 70% of the teens in our sample reported communicating less frequently with teachers since the start of the COVID-19 pandemic. Many also perceived a decline in academic and emotional support from teachers, reported by 61% and 48% of the sample, respectively.

Of course, it is critical to recognize how teachers' lives have also been upended by the pandemic. Having to navigate family obligations, technology challenges, psychological strain and COVID-19 health concerns, for example, may contribute to teacher burnout and mental health declines.

CYBERBULLYING

Although school is a common setting for bullying, we found that distance learning did not necessarily give students a reprieve from being mistreated by peers. Teens in our sample reported that cyberbullying remained relatively consistent since the COVID-19 pandemic began.

In fact a notable proportion – one in three students – reported that cyberbullying "increased" and was "more of a problem" during this time period.

It is possible that these increases reflect increases in social media use during the pandemic, given potential links between social media use and cyberbullying.

It is important to note that our study assessed only experiences of general cyberbullying. We believe attention toward teens' online experiences of bias-based bullying is much needed. One study, conducted in the spring of 2020, found that nearly half of Chinese American youth were targets of COVID-19-related racial discrimination online.

BACK-TO-SCHOOL TIPS

To alleviate teens' academic worries, schools can cultivate structure and routine for students as they resume some normalcy.

Social connection and communication between students and teachers should be prioritized, including opportunities for students to express their worries early on. Meeting with guidance counselors for support at the outset of the upcoming school year may help students cope with the transition out of the pandemic.

With the switch back to classroom instruction, schools should also ensure that teachers have the resources they need, including clear administrative guidance, to support students and avoid burnout during this reintegration period.

To get teens excited about the upcoming school year, parents might encourage them to reconnect over the summer with classmates they may have lost touch with during the pandemic. Video chatting with friends may help students reestablish social bonds and increase enjoyment of school once the academic year begins. After all, teens often report that they go to school to be with their friends, and such friendships can help them navigate academic demands and other school-related challenges. ●

COMPANIES ARE PUSHING SWEETENED DRINKS TO CHILDREN THROUGH ADVERTISING AND MISLEADING LABELS – AND FAMILIES ARE BUYING

By Fran Fleming-Milici

Walking down the drink aisle at any grocery store will take you past hundreds of drinks, from sodas to sports drinks. Children's drink sections are filled with a vast array of products as well. Most parents want to buy what is healthy for their children, but with so many options in the drink aisle, it can be difficult to make the right choice – especially when drink companies make it hard to do so.

I am a researcher at the UConn Rudd Center for Food Policy and Health, and I've studied how food is marketed to kids and parents of young children for more than a decade. Companies spend huge sums advertising children's drinks with added sweeteners. Despite the sweeteners, companies market these drinks as healthy choices for kids.

In a recent study I co-authored with colleagues at the Rudd Center, we examined advertising and purchasing trends of children's drinks from 2006 to 2017. We found, not surprisingly, that ad spending drove people to buy the drinks being advertised. The problem is that companies spend tens of millions of dollars per year promoting sweetened children's drinks. This study was one of the first to directly tie that ad spending to household purchases of unhealthy beverages. In addition, we also found that households with lower incomes were more responsive to this advertising and purchased more sweetened children's fruit drinks than households with higher incomes.

Decades of research has shown that drinking too many sugary drinks can raise the risk of heart disease, high blood pressure, type 2 diabetes and tooth decay.

Advertising appears to increase companies' profits, but not children's health.

ADVERTISING AND DEMOGRAPHICS

The food and beverage industry spends nearly US\$14 billion per year advertising their products, and around 80% of the spending promotes highly processed foods. This includes "fruit drinks" – fruit-flavored beverages with not much juice, like SunnyD – and flavored waters like Capri Sun Roarin' Waters. Both are marketed as being for children, but they contain ingredients health experts say kids should not consume, including added sugar, diet sweeteners or both.

In 2018, companies spent \$21 million advertising these sweetened drinks across all media in the U.S. They spent \$18.5 million of that promoting sweetened children's drinks through TV ads. This was far more than the \$13.6 million companies spent on TV ads for unsweetened children's drinks like 100% juices and juice and water blends.

Marketing sugary drinks directly to young kids is another tactic that companies use.

In 2018, children 2 to 5 years old saw twice as many TV ads for sugary children's drinks than they did for unsweetened juice products. Some fruit drink brands also disproportionately targeted advertising to Spanish-speaking households as well as Black children. Even packaging is aimed at kids, with sweetened drinks featuring more cartoons, brand characters and wacky names compared to drinks without added sweeteners.

This advertising can undermine parents' efforts to serve healthy drinks.

To measure the effect of this advertising, my colleagues and I looked at 12 years of monthly purchase data. We found that people living in households with lower incomes purchased significantly more sweetened fruit drinks and fewer unsweetened juices than people in households with higher income. People in non-Hispanic Black and Hispanic households also purchased more sweetened fruit drinks than non-Hispanic white households. This matches research that shows that communities of color and lower-income communities drink relatively more sugary drinks than other groups, which contributes to disparities in diet-related disease.

LOWER PRICES

Advertising is one thing that drives consumption, but pricing strategies also add to demographic differences in purchases.

I've conducted focus groups with parents of young children, and they say they'd like to purchase 100% juice. But when these parents compare prices in the supermarket, they end up buying cheaper sweetened drinks instead of the healthier beverages they intended to buy.

The recent study shows that such price disparities are getting worse. Over the 12 years we covered, prices increased for all children's drink types, but sweetened children's fruit drinks increased by an average of just 1 cent per ounce, compared to the 4 cents-per-ounce increase of unsweetened juice products.

MISLEADING LABELS

Another way companies try to push sweetened drinks is to use labels that make them appear healthier than they really are.

This happens in two main ways. First, sweetened drink labels often highlight nutrition-related claims – like "Vitamin C" or "Less sugar," for example. Second, these drinks often use pictures of fruit or words with no regulatory definitions – like "water" and "natural." Taken together, these tactics mask ingredients such as added sugars and diet sweeteners and convey the idea that these drinks are healthy choices, which likely contribute to sales.

Brands also often offer both sweetened and unsweetened drinks with nearly identical packaging and claims, so it is easy to see why parents misperceive what is in these drinks. I challenge any reader to head down a children's drink aisle in the supermarket and successfully separate the healthier drinks from the less healthy ones.

WHAT TO DO?

Between the marketing, pricing and labels, it's no wonder kids are drinking more sugary drinks. Overall, our research found that purchases of sweetened flavored waters increased by 68% from 2006 to 2017. Today, households with young children purchase three

times as many ounces of sweetened fruit drinks as unsweetened juice.

Reducing the amount of sweetened drinks kids consume when they are young could go a long way in keeping them healthy for a lifetime. Better industry self-regulation of advertising is one way to reduce this overconsumption, but the U.S. Food and Drug Administration could also get involved by mandating clear and consistent disclosures of added sugars and diet sweeteners, as well as juice percentages, on packaging. Reducing disproportionate targeted marketing of sugary drinks to communities of color would be a step in the right direction, too.

If you care about the health of children, the goal should be to make the healthy choice the easy choice. Unfortunately, our research seems to show a trend in the opposite direction. ●

UConn Health

HOW MANY PEOPLE NEED TO GET A COVID-19 VACCINE IN ORDER TO STOP THE CORONAVIRUS

By Pedro Mendes

It has been clear for a while that, at least in the U.S., the only way out of the coronavirus pandemic will be through vaccination. The rapid deployment of coronavirus vaccines is underway, but how many people need to be vaccinated in order to control this pandemic?

I am a computational biologist who uses data and computer models to answer biological questions at the University of Connecticut. I have been tracking my state's COVID-19 epidemic with a computer model to help forecast the number of hospitalizations at the University of Connecticut's John Dempsey Hospital.

This type of computer model and the underlying theory can also be used to calculate the vaccination rates needed to break the chain of transmission of the coronavirus. My estimate is that for the entire U.S., roughly 70% of the population needs to be vaccinated to stop the pandemic. But variation in how people behave in different parts of the country, as well as open questions on whether the vaccine prevents infection entirely or just prevents people from getting sick, add a degree of uncertainty.

A drawing showing a circle of green happy faces with some blue happy faces in the middle and a red frowning face unable to reach the blue faces.

When enough people are vaccinated, the coronavirus will not be able to spread from person to person.
Cavernia via Wikimedia Commons, CC BY-SA

CUTTING OFF TRANSMISSION

Clinical trials have shown that once a person gets vaccinated for the coronavirus, they won't get sick with COVID-19. A person who doesn't get sick can still be infected with the coronavirus. But let's also assume that

a vaccinated person can't spread the virus to others, though researchers still don't know if this is true.

When enough of the population is vaccinated, the virus has a hard time finding new people to infect, and the epidemic starts dying out. And not everyone needs to be vaccinated, just enough people to stop the virus from spreading out of control. The number of people who need to be vaccinated is known as the critical vaccination level. Once a population reaches that number, you get herd immunity. Herd immunity is when there are so many vaccinated people that an infected person can hardly find anyone who could get infected, and so the virus cannot propagate to other people. This is very important to protect people who cannot get vaccinated.

The critical vaccination level depends on how infectious the disease is and how effective the vaccine is. Infectiousness is measured using the basic reproduction number – R_0 – which is how many people an infected person would spread the virus to on average if no protective measures were in place.

The more infectious a disease is, the larger the number of people who need to be vaccinated to reach herd immunity. The higher the effectiveness of the vaccine, the fewer people need to be vaccinated.

NOT THE SAME EVERYWHERE

R_0 values differ from place to place because their populations behave differently – social interactions are not the same in rural and urban locations, nor in warm climates compared to cold ones, for example.

Using the data on positive cases, hospitalizations and deaths, my model estimates that Connecticut currently has an R_0 of 2.88, meaning that, on average, every infected person would pass the virus on to 2.88 other people if no mitigation measures were in place. Estimates at the county level range from 1.44 in rural Alpine, California to 4.31 in urban Hudson, New Jersey.

But finding an R_0 value for the entire U.S. is especially tricky because of the diversity of climates and because the virus has affected different areas at different times – behavior has been far from uniform. Estimates vary from 2.47 to 8.2, though most researchers place R_0 for the entire U.S. around 3.

While R_0 varies by location and between estimates, the effectiveness of the vaccines is constant and well known. The Pfizer-BioNTech and Moderna vaccines are 95% and 94.5% effective at preventing COVID-19, respectively.

Using values for vaccine effectiveness and the R_0 , we can calculate the critical vaccination level. For Connecticut, with an R_0 of 2.88, 69% of the population needs to be vaccinated. For the entire U.S., with R_0 of 3, this would be 70%. In New York City, with an estimated R_0 of 4.26 this would be 80%.

A LOT OF UNCERTAINTY

While the math is relatively simple, things get complicated when you consider important questions for which epidemiologists still have no answers.

A sign in a shop window saying the shop is closed until further notice due to COVID-19

First, the formula for critical vaccination level assumes that people interact randomly. But in the real world, people interact in highly structured networks depending on work, travel and social connections. When those contact patterns are considered, some researchers found critical vaccination levels to be considerably smaller compared to assuming random interactions.

Unfortunately, other unknowns could have an opposite effect.

Vaccine trials clearly show that vaccinated people don't get sick with COVID-19. But it is still unknown whether the vaccines prevent people from getting mild infections that they could pass on to others. If vaccinated people can still be infected and pass on the virus, then vaccination will not provide herd immunity – though it would still prevent serious disease and reduce mortality drastically.

A final question that remains to be answered is how long immunity to the coronavirus lasts after a person is vaccinated. If immunity wanes after a few months, then each individual will need repeated vaccinations.

It is hard to say with certainty how many people need to be vaccinated in order to end this pandemic. But even so, the arrival of COVID-19 vaccines has been the best news in 2020. In 2021, as a large proportion of individuals in the U.S. get the vaccine, the country will

be heading toward the critical vaccination level – whatever it may be – so that life can start to return to normal. ●

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BLOG: MEDITATE YOUR WAY TO CONCUSSION RECOVERY

By Rebecca Acabchuk, PhD

'Restoring My Lost Childhood': How As a scientist, I evaluate the impact of behavioral interventions on stress and the brain. And as a long-time yoga instructor, I have a strong personal connection to the practices of yoga, mindfulness and meditation.

Yoga has been proven to reduce symptoms of anxiety, depression, fatigue and pain, so it made intuitive sense to me that it might be beneficial for patients recovering from mild traumatic brain injury (mTBI, or concussion), who experience many of the same symptoms.

Additionally, the brain regions typically affected by mTBI (eg, frontal, parietal and white matter tracks) overlap markedly with the brain regions that are bolstered by mindfulness-based stress reduction techniques and mindfulness-based cognitive therapy.

So, along with my colleagues at the University of Connecticut, I conducted a meta-analysis of studies exploring the role that yoga, mindfulness and meditation can play in patients with mTBI. We evaluated a wide range of studies in populations that included adolescents, veterans and athletes. All were struggling with chronic mTBI symptoms. In most cases, the participants in the studies were novices with no previous yoga or meditation experience. In all, 20 studies involving 539 participants met our inclusion/exclusion criteria.

In analyzing the results of these studies, we found that yoga, meditation or other mindfulness-based interventions resulted in significant improvement of symptoms compared with controls, with improvements seen in mental health, physical health, cognitive performance and quality of life.

REBECCA ACABCHUK

Traumatic brain injuries are complex. As we often say, “If you’ve seen one concussion, you’ve seen one concussion.” However, clusters of symptoms that form feedback loops are very common. For example, physiologic pain after a brain injury may contribute to disordered sleep and anxiety, which can then exacerbate the physical symptoms in a continuous feedback cycle. Yoga and mindfulness can interrupt those feedback loops by acting on both the emotional processes (stress, anxiety, depression) and physiological mechanisms. For example, yoga has been shown to increase brain-derived neurotrophic factor, a protein that helps heal neurons in the brain. It also activates the vagus nerve, which regulates internal organ functions and vasomotor activity, and affects immune, inflammatory and other pathways. Taken together, these actions can prime the body and brain for healing.

Yoga promotes awareness of the body that is essential for proper pacing and individualized recovery. Another advantage of yoga is that it targets multiple systems, allowing the practitioner to work on physiological (breath, balance) and cognitive (focus) processes at the same time, which is exactly what is needed in multi-symptom post-concussion syndrome. Mindfulness techniques certainly don’t replace neurorehabilitation or physical therapy, but when dealing with a complex injury, they can enhance the benefits of other treatments and support healthy recovery.

Not everyone who sees mTBI patients will be well-versed in mindfulness and yoga. Fortunately, there are plenty of accessible resources for patients to explore. Remember, whatever the individual will do regularly is the best practice for them. Try these mindfulness resources:

- LoveYourBrain.com — yoga and mindfulness specifically for TBI patients and caregivers.
- Trauma-informed yoga, a practice that focuses on creating feelings of safety and choice.
- Smart phone meditation apps such as Ten Percent Happier (my personal favorite), Headspace, Buddhify or Insight Timer.

Muse brain-sensing headband, a gamified neurofeedback tool that connects to a smart phone to measure brainwaves as you meditate. ●

THERE’S NO ‘ONE SIZE FITS ALL’ TREATMENT FOR ASTHMA

A new set of guidelines recognizes the complexity in the interaction between a patient’s genetics and the environment.

By Jane E. Brody

Asthma may be a disease with one name. But experts say that unbeknown to most people who have it, it is not just one disease, nor is there a “one-size-fits-all” treatment for it.

Rather, as detailed in a new 54-page set of guidelines developed by an expert panel, in the 13 years since the last guidelines were issued, tremendous progress has been made in understanding the causes and physiological effects of various kinds of asthma and the different approaches needed to treat them and minimize flare-ups in children and adults. The guidelines were published in December in the *Journal of Allergy and Clinical Immunology*.

“In recent years, we’ve recognized that everyone’s asthma is a little different, with different underlying mechanisms, and the paradigm for treating it has changed completely,” said Dr. Michael Wechsler, an asthma specialist at National Jewish Health in Denver.

Asthma is now recognized as a far more complex condition than experts realized in 1991 when the first comprehensive guidelines were issued. It is now considered a syndrome with many different characteristics, or phenotypes, that result from the interaction between a person’s genetics and environment.

Also, though not discussed in detail in the updated guidelines, the newest treatment with what are known as biologics is heralding new forms of personalized therapy for patients with severe asthma that is not well-controlled by other, albeit cheaper, remedies. Biologics are drugs made from modified molecules from the cells of live organisms designed to target specific disease pathways that culminate in asthma symptoms.

“The last 13 years have seen an explosion of new strategies, new concepts, new understanding of mechanism, new drugs and new treatments,” Dr. Wechsler said in an interview. “In just the last five years, five new drugs have been approved for treating asthma.”

The new guidelines can be especially helpful for people being treated for asthma, mild or severe, that is now not adequately controlled. More than half of asthma patients are treated by primary care doctors, with referrals to specialists like pulmonologists or allergists when their condition is severe or doesn’t respond well to treatment, said Dr. Michelle M. Cloutier, professor emerita at the University of Connecticut School of Medicine who chaired the expert panel.

Asthma afflicts about 25 million people in the United States, including 5.5 million children. It is not an infection, although the body reacts as if an enemy had attacked it. Rather, asthma is a chronic respiratory disease in people whose airways become inflamed in response to various triggering substances or behaviors. The inflamed airways swell and narrow and the muscles surrounding them tighten, causing a bronchospasm. Unless the bronchospasm is quickly reversed, it can become very difficult to breathe and result in hospitalization or death.

Although people with asthma always have some degree of airway inflammation, they are particularly sensitive to certain factors that can make the inflammation much worse and result in labored breathing. Thus, some people with asthma have environmental allergies, for example, to pollen, animal dander, dust mites, rodents or cockroaches, that when encountered can trigger an asthmatic attack. Others are sensitive to irritants in the air, like tobacco smoke, air pollutants, or substances with strong odors.

For example, Dr. Wechsler said, “Even what is used to clean can be irritating to a person with asthma.”

For some people with asthma, a viral infection, like the flu or common cold, or use of a medication like aspirin, an Nsaid or beta-blocker, can enhance inflammation in the airways and result in labored breathing. Still others experience constricted airways when they exercise, especially in cold weather.

Even strong emotions, like fear, anger, excitement or laughter, and sudden changes in the weather are problems for some people with asthma.

Although several people I know with asthma feared they would be especially susceptible to contracting Covid-19 and becoming severely ill, the evidence has not shown an increased risk either in contracting the coronavirus or developing a worse infection if they did, Dr. Wechsler said. In fact, he added, “treating asthma may even protect against Covid.”

Researchers now recognize that the triggering event of an asthma attack can have different manifestations within the airways and therefore respond better to different treatments. As Dr. Cloutier explained, in allergic asthma, inflammatory cells called eosinophils collect in the airways, but when a viral infection triggers the inflammation, cells called neutrophils are released, warranting a different treatment.

The new guidelines highlight the value of a measurement called FENO that stands for fractional exhaled nitric oxide, a biomarker described as useful in correctly diagnosing and adequately treating asthma in different patients. For children aged 5 and older, a nitric oxide measurement can help confirm the diagnosis of asthma and evaluate the effectiveness of treatment.

Although the guidelines do not provide hard-and-fast rules, they offer valuable treatment suggestions when currently used remedies do not result in the best relief possible. For example, the panel stated unequivocally that encasing mattresses and pillows in allergy-protective covers is not in itself an adequate remedy for someone allergic to dust mites.

“Single-component interventions often do not work” in efforts to control indoor allergens, the panel wrote. Among the combined approaches suggested were using pesticides against house-dust mites on carpets, mattresses and furniture; air-filtration systems and air purifiers, including those with HEPA filters; removal of wall-to-wall carpets and area rugs, at least in the allergic person’s bedroom; and mold mitigation.

The report also cautioned against relying on a negative result from an allergy test if the person reports worsening symptoms when exposed to the allergen tested. On the other hand, some patients who test positive on an allergy test may not react to that substance in real life. Some may have developed a

tolerance to the allergen that could be undone by attempts to reduce the patient's exposure to it.

In sync with current trends in medicine toward shared decision-making, the panel emphasized the value of doctors and patients collaborating to come up with the most practical and effective approach to treat asthma in different individuals. For example, the panel wrote, "allergen mitigation interventions may be expensive or difficult for patients to use or maintain." Doctors were urged to take into account the severity of the patient's symptoms and life circumstances before recommending remedies that could be too challenging for the patient.

Patients should be engaged in treatment decisions, Dr. Cloutier said. Those with mild disease, for example, might prefer to take a single medication every day and use a "rescue" medication occasionally if they develop symptoms, while others would rather use the same two medications but only when needed. ●

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ON FEBRUARY 5, 2021

THE CORONAVIRUS IS A MASTER OF MIXING ITS GENOME, WORRYING SCIENTISTS

New studies underscore how coronaviruses frequently mix their genetic components — which could contribute to the rise of dangerous variants.

By Roxanne Khamsi

In recent weeks, scientists have sounded the alarm about new variants of the coronavirus that carry a handful of tiny mutations, some of which seem to make vaccines less effective.

But it is not just these small genetic changes that are raising concerns. The novel coronavirus has a propensity to mix large chunks of its genome when it makes copies of itself. Unlike small mutations, which are like typos in the sequence, a phenomenon called recombination resembles a major copy-and-paste error

in which the second half of a sentence is completely overwritten with a slightly different version.

A flurry of new studies suggests that recombination may allow the virus to shapeshift in dangerous ways. But in the long term, this biological machinery may offer a silver lining, helping researchers find drugs to stop the virus in its tracks.

"There's no question that recombination is happening," said Nels Elde, an evolutionary geneticist at the University of Utah. "And in fact, it's probably a bit underappreciated and could be at play even in the emergence of some of the new variants of concern."

The coronavirus mutations that most people have heard about, such as those in the B.1.351 variant first detected in South Africa, are changes in a single "letter" of the virus's long genetic sequence, or RNA. Because the virus has a robust system for proofreading its RNA code, these small mutations are relatively rare.

Recombination, in contrast, is rife in coronaviruses.

Researchers at Vanderbilt University Medical Center led by virologist Mark Denison recently studied how things go awry during replication in three coronaviruses, including SARS-CoV-2, which causes Covid. The team found that all three viruses showed "extensive" recombination when replicating separately in the laboratory.

Scientists worry that recombination might allow for different variants of the coronavirus to combine into more dangerous versions inside of a person's body. The B.1.1.7 variant first detected in Britain, for example, had more than a dozen mutations that seemed to appear suddenly.

Dr. Elde said that recombination may have merged mutations from different variants that arose spontaneously within the same person over time or that co-infected someone simultaneously. For now, he said, that idea is speculative: "It's really hard to see these invisible scars from a recombination event." And although getting infected with two variants at once is possible, it's thought to be rare.

Katrina Lythgoe, an evolutionary epidemiologist at the Oxford Big Data Institute in Britain, is skeptical that co-infection happens often. "But the new variants of concern have taught us that rare events can still have a big impact," she added.

Recombination might also allow two different coronaviruses from the same taxonomic group to swap some of their genes. To examine that risk more closely, Dr. Elde and his colleagues compared the genetic sequences of many different coronaviruses, including SARS-CoV-2 and some of its distant relatives known to infect pigs and cattle.

Using specially developed software, the scientists highlighted the places where those viruses' sequences aligned and matched — and where they didn't. The software suggested that over the past couple of centuries of the viruses' evolution, many of the recombination events involved segments that made the spike protein, which helps the virus enter human cells. That's troubling, the scientists said, because it could be a route through which one virus essentially equips another to infect people.

"Through this recombination, a virus that can't infect people could recombine with a virus like SARS-CoV-2 and take the sequence for spike, and could become able to infect people," said Stephen Goldstein, an evolutionary virologist who worked on the study.

The findings, which were posted online on Thursday but have not yet been published in a scientific journal, offered fresh evidence that related coronaviruses are quite promiscuous in terms of recombining with each other. There were also many sequences that cropped up in the coronaviruses that seemed to come out of nowhere.

"In some cases, it almost looks like there's sequence dropping in from outer space, from coronaviruses we don't even know about yet," Dr. Elde said. The recombination of coronaviruses across totally different groups has not been closely studied, in part because such experiments would potentially have to undergo government review in the United States because of safety risks.

Feng Gao, a virologist at Jinan University in Guangzhou, China, said that although the new software from the Utah researchers found unusual sequences in coronaviruses, that doesn't provide ironclad evidence for recombination. It could simply be that they evolved that way on their own.

"Diversity, no matter how much, does not mean recombination," Dr. Gao said. "It can well be caused by huge diversification during viral evolution."

Scientists have limited knowledge about whether recombination could give rise to new pandemic coronaviruses, said Vincent Munster, a viral ecologist with the National Institute of Allergy and Infectious Diseases who has studied coronaviruses for years.

Still, that evidence is growing. In a study released in July and formally published today, Dr. Munster and his collaborators suggested that recombination is likely how both SARS-CoV-2 and the virus behind the original SARS outbreak in 2003 both ended up with a version of the spike protein that allows them to deftly enter human cells. That spike protein binds to a particular entry point in human cells called ACE2. That paper calls for greater surveillance of coronaviruses to see if there are others that use ACE2 and may thus pose similar threats to people.

Some scientists are studying recombination machinery not only to fend off the next pandemic, but to help fight this one.

For example, in his recent study on the recombination of three coronaviruses, Dr. Denison of Vanderbilt found that blocking an enzyme known as nsp14-ExoN in a mouse coronavirus caused recombination events to plummet. This suggested that the enzyme is vital to coronaviruses' ability to mix-and-match their RNA as they replicate.

Now, Dr. Denison and Sandra Weller, a virologist at the University of Connecticut School of Medicine, are investigating whether this insight could treat people with Covid.

Certain antiviral drugs such as remdesivir fight infections by serving as RNA decoys that gum up the viral replication process. But these medications don't work as well as some had hoped for coronaviruses. One theory is that the nsp14-ExoN enzyme chucks out the errors caused by these drugs, thereby rescuing the virus.

Dr. Denison and Dr. Weller, among others, are looking for drugs that would block the activity of nsp14-ExoN, allowing remdesivir and other antivirals to work more effectively. Dr. Weller likens this approach to the cocktail therapies for H.I.V., which combine molecules that act on different aspects of the virus's replication. "We need combination therapy for coronaviruses," she said.

Dr. Weller notes that nsp14-ExoN is shared across coronaviruses, so a drug that successfully suppresses it could act against more than just SARS-CoV-2. She and Dr. Denison are still at the early stages of drug discovery, testing different molecules in cells.

Other scientists see potential in this approach, not only to make drugs like remdesivir work better, but to prevent the virus from fixing any of its replication mistakes.

“I think it’s a good idea,” Dr. Goldstein said, “because you would push the virus into what’s known as ‘error catastrophe’ — basically that it would mutate so much that it’s lethal for the virus.” ●

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AIR FILTERS CAN SCRUB OUT POLLUTANTS NEAR HIGHWAYS, REDUCE BLOOD PRESSURE

The Research Brief is a short take about interesting academic work.

By Doug Brugge

THE BIG IDEA

For people living near busy highways, using air filters indoors results in short-term improvements to blood pressure, according to a new study I co-authored.

Next to busy highways and major roadways, there are high concentrations of air pollution – including exceptionally tiny, invisible and odorless ultrafine particles from burning fuel. My colleagues Neelakshi Hudda, Misha Eliasziw and I tested how using air filters indoors near a highway can reduce exposure to ultrafine and other particulate pollutants – and what effect that has on blood pressure.

Our team tested 77 participants over three two-hour sessions in a room next to a busy highway. We

manipulated the level of air pollution in the room using portable air filters, windows and doors to create low, medium and high exposures to ultrafine and other particles. We measured the blood pressure of study participants every 10 minutes.

Our study found that blood pressure is dose-dependent on exposure to ultrafine particles – the higher the levels of pollution, the higher a person’s blood pressure. Importantly, we also found that air filters can effectively reduce this pollution and reduce the associated blood pressure increases.

The difference in blood pressure between high and low exposures was relatively small, below 3 mm of mercury. However, even this small change could affect risk of heart attacks and strokes if sustained over periods longer than our two-hour sessions.

WHY IT MATTERS

A lot of research has linked living close to heavily trafficked roadways with adverse health outcomes. Researchers also know that particulate air pollution affects cardiovascular health, but most work has focused on larger particles, called PM2.5.

My colleagues and I are contributing to the Community Assessment of Freeway Exposure and Health, which focuses on much smaller ultrafine particles. There is currently no regulation regarding emissions of ultrafine particles, and they have not been studied in as much detail as PM2.5. Our work and other studies have found that they are associated with biomarkers of increased inflammation and increased blood pressure.

Motor vehicles will continue to emit pollution for a long time. Since the source of these pollutants isn’t going away anytime soon, I think one good way to try to improve the health of people living near busy roads is by cleaning the air in their houses. Our study suggests that air filters can do this in a way that meaningfully lowers blood pressure.

WHAT ISN’T KNOWN

This work is promising, but the tightly controlled setting of the study might not translate into benefits for people going about their daily lives.

For people who stay home and have their windows closed most of the time, it seems likely that air filters

would have a beneficial reduction in their blood pressure similar to what we saw in our study. But many people leave their homes for extended periods for work or school. Whether there will be enough reduction in blood pressure to result in health benefits in these cases remains to be seen.

WHAT'S NEXT

My colleagues and I are currently enrolling participants for a new study exploring whether there are benefits from placing air filters in people's homes in real-life scenarios.

The participants in this new study will receive both real and sham air filters and alternate using them for one month at a time each. Our team will measure the participants' blood pressure at the start and end of each month and then compare the same person's blood pressure from month to month to see if the air filters really lower blood pressure. The results of this study should help us determine whether air filters can produce long-term reductions in blood pressure for those living near highways. ●

THIS ARTICLE WAS FIRST PUBLISHED IN CONNECTICUT
MAGAZINE ON APRIL 20, 2021

WANT TO DO SOMETHING FOR YOUR HEALTH THAT WON'T COST A THING? GET OUTSIDE

By Theresa Sullivan Barger

If you've hiked the state's parks or biked the rail trails, you've probably noticed an uptick in usage. During the pandemic, 45 percent of adults living in the Northeast reported increasing time spent in nature or outdoors, according to a study by a UConn professor. We may be drawn to the outdoors for the pretty scenery and fresh air, but it's also good for our health.

Interacting with nature benefits physical health, psychological well-being, cognitive ability and social cohesion, studies show. And it doesn't take much. In

fact, a study involving 20,000 people in England showed people spending just two hours a week outdoors in forests, parks or other green spaces reported higher health and well-being levels than those who spent no time in nature or less than two hours a week. The benefits are the same, whether taken in one two-hour chunk or spread out over the week, and whether exercising or sitting.

Spending time in nature doesn't require a trip to a state park. While most studies have compared time outdoors to time in urban settings, a few have quantified the psychological benefits of different types of nature, says Susan A. Masino, professor of applied science at Trinity College. "Gardening is definitely beneficial and its own type of immersion. They have even found a soil microbe ... that seems to have antidepressant qualities," she says.

How does time spent in nature impact our bodies and minds? It lowers blood pressure, stress hormone levels, anxiety and pulse rate and improves mood. Due to the pandemic, people have reported feeling higher levels of depression and anxiety, found Damion J. Grasso, a clinical psychologist and associate professor of psychiatry and pediatrics at UConn Health.

People spending just two hours a week outdoors in forests, parks or other green spaces reported higher health and well-being levels than those who spent no time in nature or less than two hours a week.

Studies involving those with a specific diagnosis reinforced findings from general population research. For example, a recent study found psychiatric patients who spent time gardening reported reduced feelings of isolation, improved moods, sense of calm and better social behavior. Another study with people with dementia found depression levels decreased by 10 percent, quality of life improved by 10 percent and agitation levels were cut in half after people spent time in a therapeutic garden. Even guided imagery, where someone closes their eyes and visualizes walking through a forest or on a beach, hearing the sounds and smelling the air can help people with migraine headaches treat the headache and cope with pain, says Dr. Deena Kuruvilla, a board-certified neurologist and director of the Westport Headache Institute. "Being in nature, experiencing nature, can be an effective way to complement the mainstream treatment that your doctor is giving you [for migraines]," she says.

MICHAEL SCHEWEL COLUMN: VIRGINIA'S NEW ADDICTION

By Michael Schewel

The commonwealth of Virginia has become addicted to regressive vice-based revenue streams. With the proposed casino project for Richmond, our city is headed in the same direction.

The commonwealth has become dependent on revenues from alcohol consumption (\$545 million), cigarette smoking (\$151 million) and gambling (\$650 million). Soon, the commonwealth will generate new revenues from marijuana sales (estimated at \$300 million).

To continue to generate these revenues, our state government needs Virginians in large numbers to smoke cigarettes, drink alcohol, play the lottery, gamble at casinos and smoke dope.

Otherwise, the commonwealth will be unable to pay its bills. And these vice-based revenue streams (let's call them "vicenues") all are regressive — that is, they are moneys disproportionately exacted from our poorer citizens.

For state legislators, vicenues are a political gift. Instead of having to raise taxes, legislators can fund government through vicenues. This became a huge incentive for the state to legalize marijuana to gain new revenues without a tax increase.

What our government officials instead should do, but are afraid to do, is raise taxes to pay for schools, roads, sewer systems, police and the rest of it. Since state and local taxes principally are based on income and property values, revenues generated from those tax sources are much less regressive than vicenues.

Vicenues, in contrast, contribute to social inequity. But our legislators don't have the gumption to do the right thing.

Richmond Mayor Levar Stoney and others have stated that they seek to choose a casino developer for a new

Even being indoors and observing nature through a window, looking at photos of natural settings, listening to the sounds of nature, smelling fresh air or having a plant can be beneficial, Masino adds. "Any way to pull in a little bit of connection to nature adds up." Natural settings have a way of relaxing us not just because of how they look, but because of the sounds, smells and feel of a breeze or the warm sun. The whole is always best, Masino says, adding that the multi-sensory experience of forest bathing has been shown to have significant health benefits. "If you need to be on a call for work, or listening to a recording, and that is the only time you can get out in nature, do it," she says. "There are a lot of people working from home now who may be able to spend bits of time here and there working from the woods. And these little bits of respite, small doses of nature, are a great benefit of the pandemic-induced shift in work culture."

Pediatricians prescribe time in nature to their patients using the Park Rx app that locates green spaces near a patient's ZIP code, including Dr. Leslie Sude, assistant professor of clinical pediatrics at the Yale School of Medicine and a Fair Haven Community Health Care pediatrician. Only about 30 percent of patients for whom she prescribed time in parks have reported "filling" the prescription, but the response from patients and their parents has been enthusiastic, she says. "Some patients need the added layer of a prescribed activity and the endorsement from a pediatrician which lends a sense of importance to the activity," Sude says. She suggests parents spend time in nature with their children. She understands the pandemic leaves working parents even more squeezed, and the prescription for time in nature "creates an opportunity for them to spend time together away from technology and media."

The U.S. health care system is set up to pay doctors to treat rather than prevent problems, but Bradford S. Gentry, professor in the practice of forest resources and management policy at the Yale School of the Environment, is working to change that. It would be better for people's health, Gentry says, if they spent more time in nature to prevent mental and physical health conditions from deepening. ●

Richmond casino based on “social equity” factors. If social equity is really the chief concern, then the obvious solution is to not build the casino at all.

State-sponsored gambling, in general, involves a transfer of money from poor people to more affluent people, as state and local revenue generation shifts from progressive taxes to regressive gambling tariffs.

In addition, as described by gambling expert Thomas Baber of the University of Connecticut School of Medicine: “Gambling problems tend to be concentrated, though not exclusively, in the most vulnerable and disadvantaged groups, including ethnic minorities, the homeless, the unemployed, the mentally ill, alcohol and drug users, and those who have lower incomes and socioeconomic statuses. Gambling as a solution to social revenue needs faces the risk of turning poverty into misery, even for many who do not themselves gamble at all.”

I am somewhat sympathetic to the dilemma faced by the city of Richmond. Through the Dillon Rule, the commonwealth severely limits the city’s ability to tax its citizens. Other laws effectively bar the city from expanding its tax base through annexation.

The city needs to grow tax revenues and it has relatively few ways of doing so. A casino is one of those ways. But we shouldn’t fool ourselves about the social equity issues — regardless of the diversity of the ownership group.

The overall impact of a new casino in Richmond, as with the overall impact of the other vicinues that Virginia governments have grown so fond of, will be to reduce social equity.

And as a commonwealth, we face the moral dilemma of a government that has a deeply vested interest in encouraging its citizens to drink, play the lottery, smoke and hit the casino tables, even as it piles on our most vulnerable citizens the disproportionate burdens of these policies. ●

OPINION: UCONN HEALTH IS A VITAL INSTITUTION THAT DESERVES THE STATE’S SUPPORT

By Sanford Cloud, Jr.

As chair of the UConn Health Board of Directors, I need to bring relevant facts to bear to correct recent news and editorial coverage stating that UConn Health is requesting a “bailout” of millions of dollars to “cover losses,” and suggesting that the state would be better off without a hospital that has a public mission. These assertions stem from a misunderstanding regarding what UConn Health is requesting from the legislature and how UConn Health’s public mission benefits the citizens of Connecticut.

First, UConn Health is not asking for a “bailout” from the state. Rather it is asking for relief from being required to pay over \$50 million each year in state “legacy costs.” These are costs that the state charges UConn Health and UConn to help cover the state’s pension and health care liabilities for already retired state employees of all state agencies in Connecticut (not just UConn Health).

These legacy liability costs, which accumulated over decades, are fully paid by the state for most other agencies, but not for UConn Health and UConn. Instead, UConn Health must use patient care revenue, tuition and other self-generated funds to fund these costs, which prevents UConn Health from achieving our full financial potential despite robust revenue growth and expense reductions in recent years. For example, if UConn Health did not have to pay these state legacy costs from operations, we would have finished the fiscal year ahead of budget, rather than in deficit.

It is worth noting that more than 75% of UConn Health’s budget is funded through self-generated revenue, primarily through the clinical care we provide.

Secondly, opinions voiced recently in the press about viewing the teaching hospital as separate and less important to the state than the academic enterprise fail

to acknowledge the value that UConn Health's integrated clinical and academic enterprise brings to the citizens of Connecticut and to the education and research mission. UConn Health's public mission to ensure access to cutting-edge care for all Connecticut citizens cannot be understated, which is why we draw our patients from every one of the 169 cities and towns in Connecticut. Whether it is behavioral health care for all, specialty medical and surgical care for Medicaid or underinsured patients, high-end procedures performed in an academic setting, or care for rare and often unprofitable conditions, our public mission sets us apart from other health care organizations.

There is inherent and unmistakable value in UConn Health's public mission and the service it provides to the state of Connecticut — including the hundreds of thousands of medical and dental care visits we see each year. The state made an extraordinary investment in UConn Health in the form of Bioscience Connecticut, fueling economic growth based on bioscience research, innovation, entrepreneurship and commercialization. UConn Health directly supports 5,000 Connecticut jobs, is the largest source of medical and dental professionals in the state and provides over \$2 billion in overall economic impact for Connecticut.

In UConn Health, we have an institution at the leading edge of patient care, teaching and research, of which Connecticut and its citizens can be proud. UConn Health is thankful to the governor and members of the legislature for their support, and we look forward to continuing to partner with the state to reduce the legacy costs assigned to UConn Health so our funds can be devoted to the important work our employees do every day for the people of Connecticut. ●

HEALTH ON A BUDGET? A NEW STUDY SUGGESTS GOING OUTSIDE OFFERS HEALTH BENEFITS

By Theresa Sullivan Barger

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lends a sense of importance to the activity," Sude says. She suggests parents spend time in nature with their children. She understands the pandemic leaves working parents even more squeezed, and the prescription for time in nature "creates an opportunity for them to spend time together away from technology and media."

The U.S. health care system is set up to pay doctors to treat rather than prevent problems, but Bradford S. Gentry, professor in the practice of forest resources and management policy at the Yale School of the Environment, is working to change that. It would be better for people's health, Gentry says, if they spent more time in nature to prevent mental and physical health conditions from deepening. ●

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HOW RACIAL TRAUMA AFFECTS YOUR MENTAL HEALTH, AND TIPS FOR COPING AS WE RETURN TO 'NORMAL'

By Cory Stieg

Returning to "normal" life amid Covid, like going back to the office or school, will not be business as usual.

In addition to living through a pandemic that has killed more than 570,000 people in the United States, Black, Indigenous and people of color have experienced immense racial trauma in the past year, from the murder of George Floyd exactly one year ago on May 25, 2020, to the Atlanta spa shooting in March. Racial trauma, or race-based traumatic stress, refers to "any kind of a mental or emotional injury that can be caused by encounters with racial bias, ethnic discrimination, racism and hate crimes," Wisdom Powell, director of the University of Connecticut's Health Disparities Institute, tells CNBC Make It.

Of course, racial profiling, racism, oppression and violence that happens to people directly is harmful. But things like bearing witness to the death or murder of

people of color on the internet and social media can also trigger a trauma reaction response.

Simply “existing in an environment that they perceive to be racially hostile” can be traumatizing for some, says Will Ming Liu, professor of counseling psychology at the University of Maryland, whose research includes white supremacy and white privilege.

Work places and colleagues “have to ready themselves to receive individuals who have had months of prolonged physical and social distancing and who have all been bearing witness, not just to an uptick in racialized violence, but who experience losses perhaps in their families, due to Covid-19,” Powell says.

Here are some tips from trauma experts about how to cope with racial trauma as you return to life and work.

KNOW THE SYMPTOMS

Racial trauma manifests in some of the same ways as other forms of trauma. People who experience race-based trauma may experience: hyper vigilance, increased depressive symptoms, prolonged anger and outbursts, recurring thoughts of the events, as well as physical reactions like headaches, chest pains and insomnia, Powell says.

Physiologically, your body responds to racism as chronic stress, which in turn can lead to a number of health issues, Liu says. “For BIPOC individuals, this has been a lifelong experience of retraumatization,” he says. “It’s always something that they’ve learned to cope with and built up over time.”

EXERCISE YOUR RIGHTS

It’s up to organizations to acknowledge and hold space for individuals who have experienced racial trauma and are returning to the workplace.

“Denial of racism can be re-traumatizing,” Powell says. “If workplace environments are treating this issue as if it’s not the elephant in the room, that silence equals violence and complicity.”

There are tangible things that employers can do to address racial trauma: For example, organizations can provide increased access to employee assistance programs (voluntary, free workplace-based programs

that provide counseling and other support), and make sure that people know they’re available, Powell says.

For employees who are not in a leadership position: “Don’t wait until you reach a fever pitch before you seek support,” Powell says. “Exercise all your rights [as an employee] and channels within your organization to get support, because the organization should be serving you just as much as you serve them daily in your work and contributions to their bottom line.”

It’s important for leaders at any level to demonstrate having conversations about what can be done to make a company or job a better, more inviting and supportive place for people, Liu says. “Having those conversations that lead to some kind of practical outcome, no matter how small, is important,” he says.

FIND A CONFIDANT

Figure out who in your organization can be a confidant, or person for you to confide in or seek support from, Powell says. That could be your HR department, or anyone else who will provide a “safe brain space to actually discuss what’s going on with you and to get some advice about how to negotiate the workplace environment,” she says.

Being in groups of people who you trust and have established relationships with, who are supportive and elevating, helps mitigate the “constant assault” of stress that racism causes, Liu says.

REQUEST FLEXIBILITY

Research has shown that people who have job control, flexibility and more job autonomy are less likely to experience depressive symptoms in the face of discriminatory or inequitable workplace environments, Powell says. Reentering the workplace is going to be “quite a feat,” so think about what you need in order to feel your best at work, Powell says. For example, will your workplace allow people to work remotely?

Racism is associated with several mental health consequences, such as depression, anxiety and substance use disorders, according to the American Psychological Association. “The things that people of color experience, they hold it in their bodies,” Liu says.

So make time for self-care in your schedule, even if that means taking a day off. “It’s okay to use your sick time

or other time off to actually recalibrate,” Powell says. Workplaces should consider providing or normalizing mental health days, she says.

ADVICE FOR ALLIES: ‘PASS THE MIC’

What can people do to be allies for their BIPOC peers? Acknowledge and listen to BIPOC individuals when they are ready to talk, Liu says. “Don’t expect that people will talk about it, because talking about it is also very traumatizing,” he says. Look for opportunities to elevate and “pass the mic to folks of color so that they can speak,” he says. ●

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THE SECRET LIVES OF DOCTORS – DR. MARJA HURLEY, THE MENTOR

By Theresa Sullivan Barger

A Broadway performer. An accomplished pianist. A dedicated marathoner. A third-degree black belt. An award-winning filmmaker. A water-skier with all the right moves. A high-flying fighter pilot physician. Doctors from across the state open up about their off-script origin stories and lives outside the office.

THE MENTOR

Dr. Marja Hurley, professor of medicine and orthopedics and member of the Institute of Systems Genomics at the University of Connecticut School of Medicine

Dr. Marja Hurley could have been content with being the first Black woman to receive a medical degree from the UConn School of Medicine in 1976. But while at UConn, Hurley, the daughter of a nurse, became concerned with the lack of diversity at UConn and medical schools across the country. Quietly, but with vision, planning and teamwork, this product of UConn undergraduate, medical school and residency has diversified the student body. Consider, with 11 percent of its students African American, in 2020, U.S. News &

World Report ranked the UConn School of Medicine eighth nationwide in the percentage of African American students.

When Hurley joined the UConn faculty in 1986, she planned to see patients, teach medical students and continue her NIH-funded research of bone-related disorders such as osteoporosis. She soon brought together a team and founded the Health Career Opportunity Programs (HCOP) in an effort to attract more socioeconomically and racially diverse students to medicine, dentistry and other health fields. Ten years later, she launched the Aetna Health Professions Partnership Initiative, followed by the Doctors Academy during the 2007-08 school year.

Doctors Academy students receive mentoring throughout high school, college, dental and medical school — typically 12 years. Hurley and others created the Health Disparities Clinical Summer Research Fellowship Program, which, before the pandemic, placed undergraduate college students in community health centers to shadow physicians and other health professionals for seven weeks. The program is designed to address health disparities by making future clinicians more informed, aware and sensitive. Students also receive mentoring and conduct a research project. Since its founding in 1996, the Aetna Health Professions Partnership Initiative programs have had nearly 1,000 graduates, 813 of whom are in graduate or professional programs. Students from middle and high schools and colleges have participated in at least one of 14 Aetna Health Professions Partnership Initiatives since 1996, and more than 760 of them have entered medical, dental, pharmacy or other health professions.

“When we talk about health disparities, it transcends race and also involves socioeconomic status. If you are a wealthy Black individual who did not grow up in a certain area, you also need to be educated about health disparities,” says Hurley, adding that these programs involve teams of people, including medical and dental students who volunteer to serve as mentors. “The approach I took with my team involved developing short-term and long-term strategies. I have a lot of ideas. I have a strong group of folks who help me implement what I want to accomplish.”

Loving science and admiring her family doctor while growing up in Jamaica, Hurley decided on medicine early. She knew students had to start young in order to

be prepared for the rigors of pre-med college courses. Her long-term strategy for diversifying UConn medical and dental schools involved developing a pipeline of students interested in science. She and her team work with science teachers, principals and guidance counselors in Hartford, Bloomfield, East Hartford and Manchester to identify middle school students and begin working with them. Through the Doctors Academy, high school students commit to attending college prep-level math and science classes 30 Saturdays a year and six weeks in the summer through all four years of high school.

“They need to be motivated. They need to be dependable and recommended by their teachers,” Hurley says. They can be ‘B’ students who are willing to put in the effort, she says, adding, “I think students will respond to the expectations you have for them.” It’s helpful for them to be surrounded by peers working toward similar goals. “I cannot study for them. We provide the opportunities. They know we believe in them.”

One of this year’s UConn School of Medicine graduates who has benefited from Hurley’s vision is Windsor native Faith Crittenden, who earned an undergraduate degree in chemistry from UConn and a master’s in public health from the Yale School of Public Health. Starting her residency in pediatrics at Yale New Haven Health in July, Crittenden had always loved math and science and planned to be a nurse until, at 16, she heard about the HCOP from a friend, she says.

“Through HCOP, I realized I wanted to go into medical school. Everyone in my family were nurses; that’s what I knew,” Crittenden says. Through the Saturday Academy and summer programs, she met medical students who looked like her and were from similar backgrounds. “It was when interacting with one of the students when I thought, ‘If she can go into medicine, I can too.’” She has participated “in every program ever since” and she credits Hurley and her team with “making sure everyone feels confident being there. One person tells another person and they join a pipeline,” she says. The summer program attracts students from the whole country, she says, and she now has friends working in several states. She enjoyed being one of many students of color in medical school, she says, because, “I think it made it easier to see a diversity of thought. Usually when you’re the one [person of color,] everyone comes to you and asks your opinion. We have kids who are

second- and third-generation Black doctors as well as first generation.”

Despite the success of her programs, Hurley says the biggest challenge to reaching more students is funding. The John and Valerie Rowe Endowment has provided \$6 million, for which Hurley is grateful.

Understanding the importance of parental buy-in, the team offers seminars for parents and guardians to teach them what their children need to do to be prepared for college. Before the pandemic, they offered parents dinner seminars on health-related topics such as diabetes and hypertension. Since COVID-19, they’ve given virtual presentations in English and Spanish on several topics, including the COVID vaccines, she says. “I’m not quite sure we would have been as successful without the parents.” ●

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THE SECRET LIVES OF DOCTORS – DR. JANICE OLIVERI, THE PHOTOGRAPHER

By John Roche

A Broadway performer. An accomplished pianist. A dedicated marathoner. A third-degree black belt. An award-winning filmmaker. A water-skier with all the right moves. A high-flying fighter pilot physician. Doctors from across the state open up about their off-script origin stories and lives outside the office.

THE PHOTOGRAPHER

Dr. Janice Oliveri, Internal medicine, assistant professor of medicine at UConn Health

As challenging as the past year has been for countless people including health care workers, it’s also brought some things into clearer focus. For Dr. Janice Oliveri, an internist and assistant professor of medicine at UConn Health, one of those things is that she and other health

care professionals need something that allows them to destress, to recharge and to refocus.

In Oliveri's case, that comes in the form of photography. "I really get so much out of it, and that just continues to grow photograph to photograph, year after year," she says. "One of the things I love most is that there are so many incredible details and levels of beauty in everything, really, but especially in nature, that I'd miss unless I was concentrating on it, really looking, focusing on just that subject, that moment, that photograph."

Because she chooses to operate her camera manually rather than rely on any automatic features, getting the composition, framing and lighting and selecting the right shutter speed, aperture and other settings requires a great deal of concentration. "So of course, when I'm concentrating on all that, I naturally escape from thinking about the stress of my job and any other of life's challenges," Oliveri says. "It's something that's very specific and technical, but also very freeing and creative. I really do get lost in taking a photo."

Her love for photography actually grew out of her love for science. She got her first microscope at age 7, and immediately got hooked at looking at nature and other things in such detail. In college at Vassar, she took an electron-microscopy course that required also taking pictures of the specimens and developing the photographs herself. "That's when a lot of the things I love came together — microscopy, science, medicine, nature and now this new interest, photography," Oliveri recalls. "Something inside me just lit up."

She had no extra time or money to pursue photography in medical school and her residency years, but soon after that, she bought a good camera and began taking her photography hobby seriously.

"Just as in medicine we are always learning and always striving to be better at all that we do, that's the case with photography," she says. "You build on what you've learned, but it's also a lifelong learning process, which I'm attracted to."

She took a few photography classes over the years, but is largely self-taught. "I learned from an early class years ago that you're not really photographing objects," she says. "You're photographing light. That's something I think about with each photo I take."

Her favorite subject is nature, flowers up close or interesting compositions she spots in the wild, which also adds to the attraction of photography. In order to get good photos, she has to get outside more, usually with her husband, Jeffrey, who graciously volunteers to lug around her camera equipment. She shoots with a digital SLR Canon 70D, and several lenses, her favorite being the macro lens for those super closeups.

Oliveri opts not to use Photoshop or any other editing software, but does try to create abstract images as she's shooting. "I wish I could paint or draw, but I can't," she says. "Creating a beautiful image from what I can capture with a camera is the closest I can come to making art."

Her photographs are mostly for herself, although she often gifts them to family and friends. A selection of her photographs were exhibited in the Celeste Lewitt Gallery at UConn Health in 2018.

Oliveri says she thinks medicine and photography have some key things in common, and her hobby has helped her be a better physician and vice versa. "As physicians, we are trained to be observant, and that's also such an integral part of taking great photos," she says. "And photography has definitely taught me about patience. I'm not playing with words here, but it's incredibly important to have patience with patients. Health care and medicine can be extremely busy and even hectic at times. As health care professionals, we need to know how to slow things down, to not rush things, to really focus on that moment. That applies to my work as a physician and what I do in photography." ●

THE SECRET LIVES OF DOCTORS – DR. JULIAN NIEVES, THE FARM HAND

By Ann Kaiser

A Broadway performer. An accomplished pianist. A dedicated marathoner. A third-degree black belt. An award-winning filmmaker. A water-skier with all the right moves. A high-flying fighter pilot physician. Doctors from across the state open up about their off-script origin stories and lives outside the office.

THE FARM HAND

Dr. Julian Nieves, Assistant professor of medicine at UConn Health Dr. Julian Nieves calls the experience of practicing medicine during the coronavirus pandemic “an exercise in tenacity.” But talk to him for just a few minutes, and it quickly becomes clear that he’s had a tenacious dedication to helping his community since long before COVID hit.

Born and raised in Meriden, Nieves earned his M.D. at Cornell University, did his residency at Yale University, and completed his master’s in public health and a fellowship in minority health policy at Harvard, before joining UConn as a professor and preceptor, supervising medical students as they learn. He also serves as a volunteer physician in the university’s longstanding clinic for migrant farmworkers.

The work is personal. Nieves’ parents are from Puerto Rico, and his father was a migrant worker in the 1950s. “I’m standing on the shoulders of people like my parents, who have worked very hard and allowed me to be where I am,” says Nieves, who feels a sense of duty to give back to the community in any way he can.

The UConn clinic, which has existed since 1997, offers its patients everything from basic health assessments to catching larger issues like diabetes and asthma. Many workers don’t have the economic means to go to a doctor and pay out of pocket, and the clinic is one of the few times that they can see a health care provider. Amid the coronavirus pandemic, the program has pivoted to testing and vaccinations for migrant farm

workers and other underserved members of the community.

Working as a physician over the past year has taken a lot of grit, but Nieves chooses to take an optimistic view of the future. “Unfortunately, COVID has exacerbated some of the care gaps that have traditionally existed in the health care system,” he says. “However, COVID has also provided an opportunity for innovation and for systems to be redesigned based on the lessons we’ve learned.”

Part of the innovation he hopes will help close those care gaps is health education, and how digital health technology can improve health care for underserved populations and bring care into the 21st century. He’s also a big believer in approaching health and wellness education from a holistic perspective, reminding people how to live well and maintain balance in their lives. “You have to be hopeful and you have to be an optimist,” Nieves says. “I believe in the human spirit.” ●

THE SECRET LIVES OF DOCTORS — DR. ALEXANDRE WEST, THE DANCER

By Thomas Connors

A Broadway performer. An accomplished pianist. A dedicated marathoner. A third-degree black belt. An award-winning filmmaker. A water-skier with all the right moves. A high-flying fighter pilot physician. Doctors from across the state open up about their off-script origin stories and lives outside the office.

THE DANCER

Dr. Alexandre West, Assistant professor of obstetrics and gynecology at UConn Health.

Artists aren’t always the most sensible people. But it’s not easy to keep an eye on the everyday when you’re chasing your creative dreams. Dr. Alexandre West was

bitten by the dance bug before she was barely in kindergarten and studied ballet throughout her childhood and teen years. But when it came time for college, she wasn't about to spend all her time in the studio.

"I knew a dance career doesn't last forever, so the plan was always to dance and then go to medical school," says West, assistant professor of obstetrics and gynecology at UConn Health. In high school she trained with the Oregon Ballet Theater and then enrolled in the dance program at New York University's Tisch School of the Arts. "When I was looking at undergrad dance programs, I only looked at those where I could also do my pre-med," West says. "NYU let me do that."

After earning her BFA, West spent several years teaching and dancing freelance in New York before beginning her studies at New York Medical College. While the art of dance might seem a long way from the science of medicine, West knows a number of dancers who have become MDs. "Professional ballet training is very rigorous and I think the same things that attract one to that type of pursuit attract you to medicine," she says.

Having sustained several injuries over the years, West's ballet moves are limited to stretching at the barre these days. "I'm the type of person," West laughs, "if I can't do it right, I don't want to do it." But yoga — which West teaches and practices — provides a grounding in her life and informs how she approaches her patients. "I work, I have kids, I understand the importance of maintaining that intersection of physical and emotional health. Yoga helps me to better connect my patients' mental and emotional experience to their physical experience, which allows me to help the whole person." ●

SICKLE CELL PLAGUES MANY BLACK AMERICANS, BUT THERE'S HOPE FOR BETTER TREATMENTS

By Dennis Thompson

It's been more than six months since Brandy Compton last landed in a hospital emergency room.

That's an amazing medical achievement, brought about by scientific breakthroughs that have been unfortunately overshadowed by the coronavirus pandemic, experts say.

Compton, 31, was born with sickle cell disease, a genetic condition that primarily affects people of African descent.

The disease causes episodes of pain so bad that in the past, Compton had to be hospitalized frequently for full blood transfusions.

"In grade school, I was in the hospital for a week, I'd get out of the hospital for maybe a good week and a half, two weeks, and then I'd be back in the hospital for another week," recalls Compton, who lives in Hartford, Conn. "It was constant."

But last year Compton started on a once-monthly IV drug called Adakveo (crizanlizumab), one of a handful of new sickle cell drugs approved by the U.S. Food and Drug Administration just before the pandemic hit.

The drug has cut in half the amount of blood Compton requires during a transfusion, and has prevented the sort of pain crisis that would send her to an ER, she said.

As the pandemic subsides, sickle cell disease experts are now trying to spread the word about these handful of treatments that could improve and potentially extend the lives of patients.

"In the last three years or so, three new medicines got approved by the FDA with different ways of working that could actually be used together and give more preventive, disease-modifying types of approaches

rather than just waiting for the bad complications to occur," said Dr. Lewis Hsu, chief medical officer of the Sickle Cell Disease Association of America.

Progress also is being made on cures that would fix the genetic error that causes sickle cell, either through a donor bone marrow transplant or gene therapy that would fix the patient's own stem cells, Hsu added.

'JAGGED ROCKS SHREDDING YOUR VEINS'

Sickle cell disease affects the shape of a person's red blood cells, which are normally disc-shaped and flexible enough to move easily through blood vessels.

The red blood cells of a person with sickle cell are crescent-shaped, resembling a sickle. The cells are stiff and sticky, and cause pain episodes and other health problems when they clump together in different parts of the body. They also are less capable of carrying oxygen to a person's tissues, causing chronic fatigue.

"Sickle cell feels like jagged rocks shredding the inside of your veins, and your bones being crushed," Compton says.

Sickle cell disproportionately affects Black people in the United States. About 1 in 13 Black babies is born with the genetic trait for sickle cell, and about 1 in every 365 Black babies is born with sickle cell disease, according to the U.S. National Institutes of Health.

For a long time, there was no treatment at all for sickle cell, Hsu said, outside of regular blood transfusions.

"At the age of 13, I started getting blood transfusions," Compton recalls. "After that, it started getting under control. I would be able to go about a month without having to be hospitalized. That time got longer as I got older."

In 1998, the FDA approved hydroxyurea, an oral medicine that can reduce or prevent sickle cell complications in people with specific subtypes of the disease. But following that, there was a "long gap" in new treatments, Hsu said.

That ended in 2017 with the approval of L-glutamine powder, sold under the brand name Endari. Patients sprinkle a packet of this purified amino acid powder on their food or drink twice a day, Hsu said.

"Particularly, it help the red cells be healthier and have better energy stores," Hsu said.

But the two real breakthroughs occurred in November 2019, on the cusp of the pandemic, with FDA approval of two new drugs -- Adaveko and Oxbryta (voxelotor).

Adaveko essentially creates an "oil slick" in the bloodstream that keeps sickled red blood cells from clumping, explained Genice Nelson, program director of the New England Sickle Cell Institute at the University of Connecticut. She also leads Compton's care.

"It helps to improve blood flow by having the cells move along better, gliding instead of sticking to each other," Hsu said.

SHOWING PROMISE AT A HIGH PRICE

Thanks to Adaveko, Compton now only needs four units of blood every four weeks, down from seven, and does not suffer frequent pain episodes.

The other drug, Oxbryta, improves the ability of deformed red blood cells to hold onto oxygen, Nelson said.

"It inhibits the deformation of the red blood cell, so it's able to hold onto oxygen," Nelson said. "Because the red blood cell is able to hold onto oxygen, it's able to give that oxygen to the tissues within the body."

Because these drugs act in different ways, the hope is that a sickle cell patient taking two or more would receive added benefits, Hsu said.

Unfortunately, the new drugs are expensive and insurance companies have balked at paying for them, Hsu said.

For example, Adakveo costs about \$10,000 a month for a patient, Nelson said. It seems like a great expense, but is likely cheaper than regular ER visits.

"If someone is in the hospital several days out of the month every month, dollar for dollar you'd rather invest it in preventing them from being in the hospital rather than trying to treat them once they're in the hospital," Nelson said.

Despite this, insurance companies have dragged their feet accepting the new drugs.

"We have great, great difficulty prescribing them and getting them authorized," Hsu said. "It's a case-by-case issue for every single prescription. It takes two months or so to get the authorizations, and then we go for refills or another prescription and they have to go through the same process again."

Experts hope that the track record of these drugs will lead insurance companies to relent.

"The data is clear there is benefit to patients being on disease-modifying therapies," said Dr. Alexis Thompson, head of hematology for the Ann & Robert Lurie Children's Hospital in Chicago. "The natural history of sickle cell disease is devastating. To not think about where the opportunities are to intervene early, to modify the natural history of the disease and really reduce suffering, is something we all need to be committed to." Great progress also has been made in cures for sickle cell, Hsu added.

TRANSPLANTS TRICKY, BUT IMPROVEMENTS UNDERWAY

For a long time, the only potential cure was a full bone marrow transplant from a genetically matched donor, usually a sibling, Hsu said. Only children could handle the stress of this cure, because their existing bone marrow had to be killed off through chemotherapy prior to the transplant.

But improved medications that inhibit immune system rejection now have made transplants also available to children who have a half-matched relative. These drugs selectively inhibit immune attack cells without harming the healthy stem cells being transplanted, Hsu said.

Over the past decade, even adult sickle cell patients have been receiving transplants, through a method that replaces most but not all of the person's bone marrow.

"This is a mixture that's enough to allow the donor to supply most of the red cells that are floating around, so they're not sickle red cells, and the tiny portion of host red cells are diluted heavily," Hsu said. "This has found to be successful and stable."

Five to seven research groups also are working on what could be the ultimate cure for sickle cell, a gene therapy that would take the person's own bone marrow and fix it to remove the genetic anomaly that causes the disease.

"You'd no longer have to find a donor for the stem cells," Hsu said. "You basically do your own donation of stem cells." Research efforts are focused on fixing the stem cells by treating them with a genetically modified virus, or by using newly discovered methods of gene editing, Hsu said. In both cases, the person's bone marrow is removed, treated in a lab, and then put back inside them.

These efforts have met with some hurdles, with the gene therapy causing leukemia in something like 2 of every 47 cases in some instances, Hsu said.

"We do need to keep working on ways to limit the side effects or toxicity of those approaches, but one cannot argue that the early data is quite remarkable," Thompson said.

Compton, now the mother of a healthy 9-year-old boy, is hopeful that these efforts will lead to a cure, even though she doesn't expect to benefit from one at her age. "I know about gene therapy and things like that," Compton said. "I do hope there would be a cure available." ●

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PHYSICIANS FROM UNDERREPRESENTED POPULATIONS REPORT FEWER BURNOUT DIMENSIONS

By Janel Miller

Before the pandemic, family physicians from underrepresented racial and ethnic groups reported lower frequencies of two of the three burnout dimensions listed in the Maslach Burnout Inventory Manual, researchers reported.

"This is the first time this phenomenon is being reported in a national sample of family physicians, and it confirms a potential protective mechanism," study co-author Montgomery Douglas, MD, chair of the

department of family Medicine at UConn Health, told Healio Primary Care.

The quote is: "This is the first time this phenomenon is being reported in a national sample of family physicians." The source of the quote is Montgomery Douglas, MD.

The researchers conducted a cross-sectional observational study using survey data from those who applied for American Board of Family Medicine recertification and family physicians who completed the National Graduate Survey. Of the 3,096 physician responses that were analyzed, 15% were from underrepresented populations, which the researchers categorized as participants who self-reported as Black or African American, American Indian or Alaskan, Native Hawaiian or Pacific Islander, and Hispanic or Latino. The physicians from underrepresented populations were significantly more likely to be women, speak Spanish and have an MD rather than a DO degree.

The findings, reported in *Annals of Family Medicine*, showed that underrepresented family physicians were less likely than non-underrepresented ones to report emotional exhaustion (adjusted OR [aOR] = 0.82; 95% CI, 0.69-0.99) and depersonalization (aOR = 0.54; 95% CI, 0.41-0.71).

Douglas said the data are "especially notable" since family medicine has the second largest group of professionals among all specialties who are underrepresented in medicine, as well as one of the highest rates of burnout.

The fact that family physicians from underrepresented populations tend to practice in more demographically diverse counties may account for these findings, according to Douglas. He also said it is possible that those from underrepresented populations "who succeed in becoming physicians may have more of a social justice mission, which is known to be an anti-burnout attribute."

Overall, Douglas said the results underscore the "value" that physicians from underrepresented groups bring to the workforce and offer "an additional reason to advocate for and devote resources to diversifying the physician workforce."

"[This is] a phenomenon that should be studied; for, if confirmed, these attributes and professional skills

should be developed further in medical schools independent of physicians' race or ethnicity," Douglas said. ●

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EXTENSIVE ASSESSMENT CRITICAL TO DISPEL 'AMBIGUITY' MIMICS IN JUVENILE DERMATOMYOSITIS

Juvenile dermatomyositis challenges rheumatologists to accurately assess not only the skin but also pulmonary and cardiac function in making a diagnosis, according to a speaker at the 2021 Rheumatology Nurses Society annual conference.

"Juvenile dermatomyositis is the most common inflammatory myopathy of childhood," W. Blaine Lapin, MD, assistant professor at the University of Connecticut School of Medicine, told attendees.

There "may be some ambiguity based on presentation" W. Blaine Lapin, MD, told attendees, suggesting that juvenile dermatomyositis may mimic or overlap with syndromes including polymyositis or amyopathic dermatomyositis. *Source: Adobe Stock*

The condition is a multisystemic autoimmune vasculopathy marked by proximal muscle weakness and rash with an average age of onset of 7 years. "This is characterized by a symmetric axial and proximal muscle weakness," Lapin said.

Importantly, children experiencing these complications may have trouble climbing stairs or getting out of bed, according to Lapin.

Regarding the rash, Lapin noted that patients with JDM may have Gottron's papules or heliotrope rash, malar erythema, linear extensor erythema and V- or shawl-sign rashes. There may be raised rashes over extensive surfaces, while the metacarpophalangeal or proximal interphalangeal joints may be impacted. "It can also be over the elbows or knees," Lapin said.

A small vessel vasculopathy with dilated and tortuous periungual capillaries may be present. "In addition to skin and muscle involvement, gastrointestinal, pulmonary and cardiac systems may be affected," he said.

Gastrointestinal complications may include perforations, gastric ulcers or constipation, while tachycardia is the most common cardiac complication.

Laboratory tests in the diagnosis of JDM should include a complete blood count, a comprehensive metabolic panel, creatinine kinase, lactate dehydrogenase, aldolase, erythrocyte sedimentation rate (ESR)/C-reactive protein, thyroid stimulating hormone, myositis-specific and myositis-associated autoantibodies and antinuclear antibodies. "About 70% of individuals have at least one autoantibody," Lapin said. "Autoantibodies help describe certain phenotypes of JDM."

To diagnose lung disease, a simple chest X-ray may be sufficient to start. A pulmonary test or a high-resolution chest CT scan with interstitial lung disease protocol may also be necessary. An MRI or muscle biopsy may be used to assess for myopathy, according to Lapin.

For clinicians making a differential diagnosis, Lapin suggested that there "may be some ambiguity based on presentation." JDM may mimic or overlap with syndromes including polymyositis or amyopathic dermatomyositis.

Corticosteroids are the "hallmark" of JDM treatment, Lapin said. "They work well in up-front treatment [and] lead to improvement in function," he said. Steroids may be administered in pulse dosing at first, followed by an "extensive course" of oral steroids. "Oral steroids can be administered with a slow taper, possibly as long as a year."

Intravenous immunoglobulin, methotrexate, hydroxychloroquine, cyclosporine and rituximab (Rituxan, Genentech) have been used with some efficacy in this patient population, according to Lapin.

Regarding expected disease course, Lapin noted that clinicians may observe a "rule of thirds." This means that one-third of patients will have a monocyclic course that will last for less than 2 years, followed by a permanent remission; one-third will have a polycyclic course marked by repeated flares and remissions; and

one-third will have persistent disease that is difficult to control.

Favorable prognostic factors include a shorter delay to diagnosis, lower skin disease activity and early aggressive treatment. Patients at risk for a poor prognosis include those with a longer duration of untreated disease, higher baseline or persistent skin disease activity, the presence of subcutaneous edema on MRI at diagnosis or extensive myopathic and severe arthropathic changes on the initial muscle biopsy, according to Lapin.

If there is a final consideration for clinicians treating pediatric patients with JDM, it is the transition to adult care. "Parents may have increased worry," he said. "The whole family may be impacted by this chronic illness. There is an importance on psychosocial support." ●

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A BLACK MAN FEARED THE VACCINE BECAUSE OF THE TUSKEGEE EXPERIMENT. AFTER COVID-19 DEVASTATED HIS FAMILY, HE CHANGED HIS MIND

By Neelam Bohra and Christina Zdanowicz

Timothy Moore grew up wary of medical treatments in his hometown of Tuskegee, Alabama.

His parents had seen what happened to Black people who participated in the unethical Tuskegee syphilis study, where researchers let syphilis progress in Black men without treating them to justify treatment programs for them between 1932 and 1972.

So when Covid-19 vaccines became available, Moore and his family didn't rush out to get inoculated. His parents, both born in the 1960s, had only recently been

open to getting flu vaccines, Moore said Monday on CNN's "New Day."

But one after another, his family began contracting the coronavirus, and so did Moore. He has asthma, a preexisting condition that worsens the risk for severe symptoms from Covid-19.

"I'm just trying to breathe, and people don't understand how damaging and how vicious this disease is, and this coronavirus is just a massive blow to your body and to your mind. There were days I couldn't even get up out of the bed," Moore told CNN.

He then saw his girlfriend and children bedridden. He said his godbrother, Ulysses Jones, died last week and was buried Saturday.

Now, he said, he's changed his mind and decided to get the vaccine. Although he didn't say whether he has received it yet, he urged others to consider the community's interests when making the choice.

"I still get nervous about the long-term effects of what may be later on down the line because we're not sure yet, but what I am sure of is we're burying people right now," Moore said. "Families and loved ones are being devastated and completely destroyed by this pandemic."

In the Tuskegee experiment, the federal government had penicillin treatments available, but never intended to treat the Black men involved. Researchers didn't share their real purposes with the subjects involved, and the study, which was originally supposed to last six months, lasted 40 years.

But the Black community's wariness of medical treatment stems from systemic discrimination that goes beyond the Tuskegee experiment. And Covid-19 has disproportionately impacted Black communities across the country.

"We tried to stay away from vaccines, anything that was injected or anything foreign from our body. In the back of my mind, that was always something that lingered into my adulthood," Moore said.

The medical community needs to actively work to build more trust with the Black community to help overcome vaccine hesitancy, according to a recent study published in the Journal of Racial and Ethnic Health Disparities.

"Providing vaccine information/communication geared towards ethnic and minority populations online and in physical locations such as churches, mosques, faith-based institutions, barber shops, hair salons, and other trusted community-based organizations in addressing vaccine hesitancy and providing vaccine and health-related information is key for ensuring that information reaches these communities," Cato T. Laurencin, a University of Connecticut professor and medical physician, wrote in the study.

At the same time, these communities do not make up the largest groups of unvaccinated people.

There are many reasons why people don't get vaccinated. Some are motivated by politics, but officials at the White House and researchers at the Centers for Disease Control and Prevention have also expressed concerns about Black Americans who mistrust the medical community and are hesitant about getting the shot because of a long history of abuses such as what happened in Tuskegee.

There's also concern that many unvaccinated Americans don't oppose vaccination, but have trouble making the time to get vaccinated, or haven't felt strongly motivated to do so.

But as the Delta variant ravages unvaccinated populations, Moore recommended everyone continue taking precautions to avoid landing in his situation.

"If I can just help one person not go through the sorrow that I'm feeling," Moore said, "I'm fighting back tears right now because I'm thinking about the people that I've lost. I'm thinking about how many other people around the nation, thinking about the Black people that I represent right now and everyone that has been devastated by this pandemic, and I just send love to everybody." ●

SHOULD VACCINE MAKERS PROMOTE THEIR PRODUCTS? EXPERTS QUESTION ETHICS

By Jordan Fenster

Experts in medical ethics have expressed concern over the way Pfizer has promoted its COVID-19 vaccine.

“There's a few things that really bothered me. One is, a few months ago, you got the Pfizer CEO going out and saying, ‘We're going to need boosters,’” said Rick Martinello, head of infection prevention at Yale New Haven Health. “You know, that's inappropriate. That taints the situation.”

Pfizer, though, said part of the company's job is to remain transparent, particularly in the midst of a global pandemic.

“We have to take into consideration that over the last year and a half everything is unprecedented,” said Jerica Pitts, Pfizer's director of global communication.

In April, Pfizer CEO Albert Bourla said people could need a booster shot of the vaccine within a year.

“A likely scenario is that there will be likely be a need for a third dose, somewhere between six and 12 months and then from there, there will be an annual re-vaccination, but all of that needs to be confirmed. And again, the variants will play a key role,” Bourla told CNBC.

That was months before the FDA fully approved the vaccine in August, and long before the FDA decided this month against authorizing population-wide boosters. The FDA did approve boosters under limited circumstances and on Friday in Connecticut, people older than 65 and health care workers began getting boosters. More than 20,000 immunocompromised individuals had already received addition shots of the Pfizer vaccine in the state.

The process for booster approval typically is that research is published in a medical journal, peer-reviewed and supplied to regulators for analysis,

according to Audrey Chapman, who holds the Healey chair on medical ethics and humanities at UConn. Pfizer, she said, “is not behaving in an ethical manner.”

“The (Centers for Disease Control) makes the determination about whether it should be distributed,” Chapman said. “But usually they only make that decision after the FDA has decided that it approves something and then it goes to an advisory committee at CDC, their Advisory Committee on Immunization Practices, which makes the recommendation to CDC about whether or not it should be authorized for us.”

In the case of booster shots for the COVID-19 vaccine, the process has been different.

“Many companies issue press releases all the time about the success of studies concerning their drug. It happens all the time,” said Art Caplan, founding head of the Division of Medical Ethics at NYU Grossman School of Medicine and a Ridgefield resident. “But, what happens is the media transforms an announcement into a press release for them that touts the drug.”

“That leads to some problems,” he said.

Pitts said the decision of whether or not to approve the vaccine for use is left to regulators.

“We have never said, ‘We're telling parents to get vaccinated,’” she said. “Even though we're sharing results, that's not making a recommendation from Pfizer that children should be vaccinated.”

“We have never said that our role is to make the decision,” she said.

There is a practical difference between a press release sharing data, Caplan said, and an advertisement for a drug.

“These announcements are all just saying the research looks good,” Caplan said. “The TV ads are saying use this drug, pester your doctor to prescribe it to you.”

Pitts agreed. She said Pfizer has never advertised the vaccine, only shared results from clinical trials.

“We don't advertise this,” she said. “This is a different form of communication.”

The purpose of Pfizer sharing data on its vaccines before FDA approval, Caplan suggested, might be to drive investment in the company or to generate

“pressure from the public to get the drug approved more quickly.”

“Morally, you want to make sure that hype and buzz does not drive the decision,” he said.

Pitts said she “can’t speak to what the FDA feels has an impact on them.”

But Martinello called it “the tail wagging the dog.”

“The academic work comes out first,” he said. “With the pandemic, it has changed how we do things, and out of necessity.”

From an ethical standpoint, Caplan said, “it makes a difference to the ethics” if they are “boosters” or simply the third in a series of three-shot vaccines.

“Many vaccines, to work, require three shots,” he said. “It may be that what we’re talking about is, if you want to get vaccinated against COVID you need three shots.

Both Caplan and Martinello expressed concern that pharmaceutical companies will use public opinion to pressure regulators in the future. When asked if that was likely, Caplan said “I hope not, but I worry that we may.”

Caplan said similar tactics were used when patient advocate groups pressured the FDA to approve Aduhelm, used to treat Alzheimer’s disease, earlier this year.

“This tests the waters for them,” Martinello said. “Granted, when we’re no longer in a public health emergency, some things will revert back to our pre-COVID normals. But we know our lives are always going to be different and impacted by this, and this is no different. It does test the waters to an extent it sets that precedent. And I wouldn’t be surprised if we see him see more of it.”

Martinello said he believes Pfizer has both public health and “a responsibility to their shareholders,” though he said “they’re not mutually exclusive intents.”

“They can have both intents and it kind of makes sense,” he said.

Chapman noted that Pfizer, “unlike any of the other major vaccine manufacturers, did not accept money from the U.S. government to help develop their vaccine.”

“It has therefore left them free to charge whatever they want to charge,” she said. “Apparently, in the first quarter of the year, they had U.S. sales of \$2 billion and global sales of \$5.8 billion. So they’re making, already, a huge amount of money from their vaccine.”

Money made from sales of the vaccine, she said, would likely increase.

“They’ve announced that after the pandemic is over, and not specifying how that would be determined, that they’re going to increase the price of their vaccine,” she said. “It’s already been increased, at least in Europe, to \$23.15 per dose, which is a lot of money.” ●

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FIRST, IMPRESSIVE VACCINES FOR COVID. NEXT UP: THE FLU.

Vaccine makers are betting that the mRNA technology powering two successful Covid vaccines will help curb the tragic global death toll from the flu.

By Carl Zimmer

As the world grapples with Covid-19, influenza isn’t getting much attention these days. But the flu’s global impact is staggering: three million to five million cases of severe illness every year, and up to 650,000 deaths. Every few decades, a new flu strain spills over from animals and leads to a pandemic.

The deadly toll of influenza is all the more striking when you consider that we have had vaccines to fight it for eight decades. But they remain mediocre. A flu shot is good for only one flu season, and its effectiveness typically reaches somewhere between 40 and 60 percent. In some years it’s as low as 10 percent.

But a new generation of highly effective flu vaccines may emerge in the next few years, based on the same mRNA technology that has protected hundreds of millions of people against Covid-19.

While traditional influenza vaccines are grown for months in chicken eggs, mRNA vaccines are manufactured relatively quickly from scratch. In theory, their faster production may make them better matched to each season's flu strains. And when they're injected into people, they may provoke a stronger immune response than traditional flu vaccines do.

Two companies — Moderna, the Massachusetts biotech company that produced one of the authorized mRNA vaccines for Covid-19, and Sanofi, a French vaccine maker — began trials for mRNA flu vaccines this summer. Pfizer and BioNTech, the companies that produced the other mRNA Covid-19 vaccine, started their own flu trial last month. And Seqirus, a vaccine producer based in England, is planning to test another mRNA vaccine for the flu early next year.

No one can say for sure how well any of these four seasonal flu vaccines will turn out, but many experts are optimistic. And further down the line, mRNA technology may be tailored to make vaccines that work for years against a wide range of influenza strains.

"I am beyond excited for the future of flu vaccination," said Jenna Bartley, an immunologist at the University of Connecticut.

NOT GOOD ENOUGH

The 1918 influenza pandemic was the worst in modern history, killing somewhere between 50 million and 100 million people. As the death toll climbed, doctors responded by inoculating people by the thousands with an assortment of experimental vaccines. None of them worked.

Scientists at the time wrongly believed that disease was caused by bacteria, not viruses. That error led them to make vaccines from the microbes they gathered in the sputum of flu patients. The vaccines were useless at mounting an immune defense against the viral disease.

It was not until 1933 that British virologists isolated the influenza virus, finally making it possible to design an effective vaccine. Researchers injected influenza viruses into chicken eggs, where they multiplied. Once they had extracted and purified the new viruses, they killed them with chemicals, and injected the inactivated viruses into people.

The United States licensed the first commercial influenza vaccine in 1945. The Nobel-prize-winning virologist Wendell Stanley hailed the milestone, declaring that the vaccine would prevent influenza from ever again becoming "one of the great destroyers of human life."

But the vaccine didn't quite live up to Dr. Stanley's hopes. Influenza outfoxed it with an awesome power to mutate.

During an influenza infection, cells in our airway begin copying the virus's genome, allowing it to proliferate. The copying process results in lots of genetic errors. Sometimes these mutations will enable the virus to escape the body's immune response spurred by a vaccine.

Flu viruses also have another route to rapid evolution. If two types of flu viruses infect the same cell, it can produce a genetic hybrid, which may evade vaccine-triggered immunity even more successfully.

This extraordinary capacity for change also explains why several strains of flu may circulate in a single flu season, and new strains may rise to dominance the following year.

"The flu virus, for lack of a better word, is just kind of a jerk," Dr. Bartley said.

Vaccine makers have responded by including up to four different strains in their annual formulations. But because producing vaccines in chicken eggs is such a slow process, scientists must choose which strains to include several months before a flu season, often leading to a mismatch when the shape-shifting virus actually arrives.

"It's an educated guessing game," said Dr. Alicia Widge, an immunologist at the National Institutes of Health's Vaccine Research Center. "We're always catching up with the virus."

Between 2004 and 2019, the effectiveness of the flu vaccine ranged from as high as 60 percent to as low as 10 percent. Even that modest protection translates into a lot of benefit, however, because so many people get the flu every year. In addition to lowering the odds of getting infected, the vaccine also lowers the chances that people sick with the flu have to go to the hospital.

In the 2018-19 flu season, the flu vaccine — with an effectiveness of just 29 percent — prevented an estimated 4.4 million illnesses in the United States alone, plus 58,000 hospitalizations and 3,500 deaths,

If scientists could make more robust flu vaccines, they could potentially save thousands of additional lives.

“The bottom line is that the flu vaccines we have aren’t good enough,” said Nicholas Heaton, a virologist at Duke University School of Medicine.

IMMUNE FACTORIES

In the 1990s, a few researchers set out on an entirely new course, making flu vaccines from mRNA. The idea behind the technology was radically different than the chicken-egg approach. In effect, the new shots would turn people’s own cells into vaccine factories.

Scientists would create an mRNA molecule with the instructions for making an influenza protein, then deliver it into cells. Those cells would then make copies of the viral protein, some of which would end up on their surface. Immune cells passing by would detect the alien proteins and respond with a defense against the virus.

In 1993, a team of French scientists conducted the first experiments on an mRNA vaccine for the flu. The vaccines produced promising responses in mice, but were still primitive. For one thing, the animal’s cells sometimes responded to the vaccine’s mRNA by destroying it, as if it belonged to a foreign enemy. It took more than two decades of additional lab work before mRNA vaccines were ready for human trials.

When Moderna formed in 2010 to bring mRNA vaccines to the clinic, influenza was one of the first diseases it tackled. The company started with vaccines for two flu strains that normally infected birds but sometimes sickened people — exactly the kind of viruses that might give rise to new pandemics.

Their first clinical trial results, in 2016, were encouraging. The volunteers produced antibodies against the viruses, though they also had side effects like fever and fatigue. The results spurred Moderna to build a new factory in Norwood, Mass., where the company could make large quantities of mRNA for more clinical trials.

The company began developing a new flu vaccine, this one for seasonal influenza rather than for pandemics. And the researchers worked on making the side effects of the vaccine less severe.

“You want folks to feel comfortable strolling into CVS and getting their shot, and not be worried about adverse events,” said Rose Loughlin, vice president for research and development strategy at Moderna.

The Coronavirus Pandemic: Key Things to Know

The Omicron variant. The latest Covid-19 variant was identified on Nov. 25 by scientists in South Africa and has since been detected in at least 45 countries, including the U.S. New York State identified its first cases on Dec. 2, and at least 16 other states have reported infections. Should you be concerned? Here are answers to common questions about Omicron.

Understanding the mutation. Scientists in South Africa said that the Omicron variant appeared to spread more than twice as quickly as Delta and that past coronavirus infections give little immunity against it. In the U.S., sequencing labs are speeding up the screening of samples from travelers.

Biden’s winter Covid plan. As Omicron reached the U.S., President Biden announced a new pandemic strategy that includes hundreds of family-centered vaccination sites, booster shots for all adults, new testing requirements for international travelers and insurance reimbursement for at-home tests.

Travel restrictions and lockdowns. Germany has announced tough restrictions on unvaccinated people, barring them from many aspects of public life. Japan, Israel and Morocco have stopped all foreign travelers, and Australia delayed reopening its borders. Here’s what to know about travel restrictions.

But then in early 2020, just as they were hoping to begin a new flu trial, the scientists had to shelve the plan. A new coronavirus was exploding in China.

COMBO SHOTS

Over the next year, Moderna made and tested a Covid mRNA vaccine in record speed. And its shot, like that of its primary competitor, Pfizer-BioNTech, was remarkably protective, with an efficacy rate around 95 percent.

The success of mRNA vaccines delivered huge revenues to both companies. The Pfizer-BioNTech vaccine is on track to become the best-selling medicine of all time. And Moderna's market cap since the beginning of the pandemic increased 19-fold to around \$123 billion.

Riding the mRNA wave, these companies, along with Sanofi and Seqirus, are moving on to seasonal flu projects.

Jean-François Toussaint, Sanofi Pasteur's head of global research and development, cautioned that the success of mRNA vaccines against Covid did not guarantee similar results for influenza.

"We need to be humble," he said. "The data will tell us if it works."

But some studies suggest that mRNA vaccines might prove more potent than traditional ones. In animal studies, mRNA vaccines seem to provide a broader defense against influenza viruses. They prompt the animals' immune systems to make antibodies against the virus, and also train immune cells to attack infected cells.

But perhaps most important for the flu, mRNA vaccines can be made rapidly. The speed of mRNA manufacturing may allow vaccine makers to wait a few extra months before picking which influenza strains to use, potentially leading to a better match.

"If you could guarantee 80 percent every year, I think that would be a major public health benefit," said Dr. Philip Dormitzer, Pfizer's chief scientific officer.

The technology also makes it easier for mRNA vaccine makers to create combination shots. Along with mRNA molecules for different strains of influenza, they can also add mRNA molecules for entirely different respiratory diseases.

At a Sept. 9 presentation for investors, Moderna shared results from a new experiment in which researchers gave mice vaccines combining mRNAs for three respiratory viruses: seasonal flu, Covid-19 and a common pathogen called respiratory syncytial virus, or RSV. The mice produced high levels of antibodies against all three viruses.

Other researchers have been searching for a universal flu vaccine that could protect people for many years by fending off a broad range of influenza strains. Rather

than an annual shot, people might need only a booster every few years. In the best-case scenario, one vaccination might even work for a lifetime.

At the University of Pennsylvania, a team of researchers led by Norbert Pardi is developing mRNA vaccines that encode proteins from influenza viruses that mutate only rarely. Experiments in animals hint that these vaccines could remain effective from year to year.

Although Moderna isn't working on a universal flu vaccine at the moment, "it's absolutely something we'd be interested in for the future," said Dr. Jacqueline Miller, the company's head of infectious disease research.

Even if mRNA flu vaccines live up to expectations, they will probably need a few years to gain approval. Trials for mRNA flu vaccines won't get the tremendous government support that Covid-19 vaccines did. Nor will regulators be allowing them to get emergency authorization. Seasonal flu is hardly a new threat, and it can already be countered with licensed vaccines.

So the manufacturers will have to take the longer path to full approval. If the early clinical trials turn out well, vaccine makers will then have to move on to large-scale trials that may need to stretch through several flu seasons.

"It should work," said Dr. Bartley of the University of Connecticut. "But obviously that's why we do research — to make sure 'should' and 'does' are the same thing." ●

WHAT WE CAN DO ABOUT THE MENTAL HEALTH CRISIS ON COLLEGE CAMPUSES

By Andrea Rice

- Mental health on college campuses is declining.
- In the past month, two student suicides and two other suicide attempts occurred at UNC-Chapel Hill.
- Some experts refer to the pandemic as a “syndemic,” which disproportionately affects college students from marginalized groups.
- Student mental health reform should start at the institutional level.

World Mental Health Day (Oct. 10) coincided with the same weekend a student died by suicide at the University of North Carolina at Chapel Hill. Another student was hospitalized following a suicide attempt.

The incidents echoed another student suicide and a suicide attempt that occurred at UNC-Chapel Hill in September.

To address the impact of the tragedies on student mental health, the University canceled classes the following Tuesday for a campus-wide Wellness Day.

“We are in the middle of a mental health crisis, both on our campus and across our nation, and we are aware that college-aged students carry an increased risk of suicide,” Chancellor Kevin M. Guskiewicz wrote in a message to UNC students.

THE STATE OF MENTAL HEALTH ON COLLEGE CAMPUSES

The American Psychological Association indicates that mental health on college campuses has been steadily declining in recent years.

The 2014 National Survey of College Counseling Centers reported that 52% of college students experienced mental health issues, including anxiety and depression, increasing from 44% in 2013. Many respondents

indicated sexual assault and self-harm as contributing factors.

Indeed, college can be a stressful experience for many students, but quality mental health care is not always available on campus.

Following the suicides at UNC-Chapel Hill, some students took to social media to voice their concerns that the University lacked funding for adequate counseling services for its student body.

“What happened at UNC is a powerful, painful illustration of what happens when we fail to speak to our own wounds,” said Wisdom Powell, PhD, director of the Health Disparities Institute and associate professor of psychiatry at UConn Health.

“This watershed moment gives college campuses an opportunity to look at their budget priorities and ask themselves critical questions,” Powell said. “Are we centering emotional well-being as a value in everything we do?”

THE ROLE OF THE PANDEMIC

Recent research shows that student mental health has worsened during the COVID-19 pandemic.

In 2020, a report from the Centers for Disease Control and Prevention (CDC) Trusted Source showed that adverse mental health symptoms, suicidal ideation, and substance use were significantly higher among young adults 18 to 24 years old, the range in which most students are enrolled in college.

As other researchers have suggested, Powell said that for young people, the pandemic has a “syndemic,” or synergistic effect, factoring in socio-economic, -political, cultural, and contextual issues that vary depending on a student’s circumstances, particularly their racial or ethnic background.

“Our young people are becoming adults during a tumultuous and uncertain time,” Powell said. “That to me is a perfect storm for an exacerbation of student mental health crises across our nation.”

HOW MINORITIZED STUDENTS ARE DISPROPORTIONATELY AFFECTED

It’s true that all students, regardless of race, have been affected by the pandemic in some way. Yet, students

from minority populations are more likely to experience greater rates of pandemic-related stress.

Research shows that the COVID-19 pandemic has had a disproportionate impact on racial and ethnic minorities, including job loss, financial insecurity, and severe illness or death from the virus.

In addition, BIPOC individuals tend to have limited access to quality and affordable mental health care compared with their white counterparts.

For many minority groups, the syndemic has also been amplified by racialized violence and nationwide protests.

“Minoritized students are not just bringing to college campuses the sorrows and the isolation of the pandemic, they’re bringing the sorrow of having lost loved ones and people in their communities from COVID-19 and for having to grapple with the deaths of George Floyd, Breonna Taylor — you name it,” Powell said.

“We need to support students from both majority and minoritized populations, but we also need to pay attention to their specific and unique needs,” she added.

THE NEED FOR SYSTEMIC CHANGE

For many minority students, at the root of the syndemic is the absence of a robust, diverse mental health workforce. There are not enough mental health professionals of color who can effectively serve students from marginalized groups.

“This is less about the limited availability of services on a single college campus or collection of college campuses,” Powell said. “This is a structural issue plaguing the mental health profession for a long time.”

Powell said that investing in physical and mental health legislation could help create systemic change.

“The demand for mental health services is only going to increase, and I worry that we’re not paying enough attention at a structural level,” she added.

STIGMA REDUCTION

Despite that mental health equity is still lacking, the stigma surrounding mental health is starting to fade.

“The pandemic has also reminded us about our shared humanity and vulnerability,” Powell said.

Yet, the stigma reduction has presented a new predicament, as college counseling centers have become overwhelmed.

To meet the demand, many schools have started to increase their funding for mental health services.

For instance, colleges and universities across the state of Connecticut have joined the Jed Foundation (JED), a nationwide initiative that helps schools strengthen their mental health, substance use, and suicide prevention programs.

At the University of Pennsylvania, where 14 students died by suicide from 2013 to 2017, student-led mental health groups, such as Cogwell, provide peer support counseling to students experiencing mental health difficulties, especially during the pandemic.

As a Cogwell student leader, Kelsey Warren, a senior at UPenn studying international relations and data science, said she’s noticed that students have become more comfortable talking openly about their mental health compared with years past.

“What I’ve noticed among my peer group is the tendency to bring up these challenges in a casual way in conversation, which I can attribute to national dialogues and social media platforms that have normalized the idea that it’s OK not to be OK,” she said.

HOW COLLEGE STUDENTS CAN PRIORITIZE MENTAL HEALTH

College mental health services can be an opportunity to check in and talk through the stress of college, issues happening at home or in relationships, and of course, the pandemic.

Many schools, including UNC-Chapel Hill, encourage students to talk about their feelings and emotions and offer mental health services both in-person and remotely.

Sara Makin, MSed, LPC, NCC, founder and CEO of Makin Wellness, said students don’t need to be diagnosed with a mental health condition to take advantage of the counseling and psychological centers offered at most schools.

“College can get busy and might push you to certain limits,” Makin said. “Most colleges or universities offer an unlimited or certain amount of free sessions to their students.”

In addition to counseling, Makin recommends the following self-care tips for college students:

- Consider being an advocate for yourself and others.
- Try to stick to a self-care routine.
- If you can, focus on nutrient-dense foods and exercise regularly.
- Try to get 7 to 9 hours of sleep a night.
- Socialize with your peers, but respect your personal limits.
- Recognize the risks of substance use and abuse.

LOOKING AHEAD

The tragedies at UNC-Chapel Hill illuminated a larger issue affecting college students across the country.

Communities can support young people’s mental health by acknowledging the emotional wear and tear that accompanies coming of age during a pandemic, whether that’s lending a listening ear or encouraging them to seek help.

“We are a nation exhausted,” Powell said. “What can we as a society do to create a culture of caring in a moment when it’s clear we all need it?” ●

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HOW AGING AFFECTS YOUR IMMUNE SYSTEM

By Lisa Esposito

As you get older, your immune system ages with you. There's even a medical term for it – immunosenescence – the gradual decrease in immune function that comes with age. Similar to your walking or running speed, your body's ability to fight off infection inevitably slows.

COVID-19 has added another health hazard for older adults. Once infected with the virus, people in their 60s,

70s, 80s and above are at increasingly higher risk of experiencing severe COVID-19 illness, hospitalization and death.

Although its difficult to precisely measure the impact of immune-system aging, "We know that it adds a massive risk," says Dr. Janko Nikolich-Žugich, a professor and chair of immunobiology at the University of Arizona College of Medicine–Tucson. "Those over 80 are 260-fold more likely to die from COVID-19 than those between 18 and 39."

The good news is the COVID-19 vaccine is highly effective at any age – making full vaccination critical for older adults. Research confirms its value:

A large study of COVID-19 vaccination coverage and mRNA vaccine (Pfizer and Moderna) effectiveness included more than 6.5 million U.S. veterans. One-half of these participants were ages 65 and older. For full (two-dose) vaccination, average effectiveness against infection was 97% for participants overall, and 94% – still very high – for veterans ages 65 and older. Among participants who were immunocompromised, vaccine effectiveness was 87%.

Full vaccination is effective for preventing hospitalization in older adults, according to findings in the August 13 issue of the Morbidity and Mortality Weekly Report. The 13-state analysis showed 96% effectiveness for Pfizer and Moderna vaccines, and 84% effectiveness for the Johnson & Johnson vaccine in adults ages 65 to 74. For adults ages 75 and older, effectiveness was similar: Moderna (96%), Pfizer (91%) and J&J (85%).

Older adults are doing better than expected, says Nikolich-Žugich, who is also co-director of the Arizona Center on Aging. "There is a strong response after two doses of mRNA vaccines," he says. "We still do not know enough about it's durability or breadth – but so far, so good. Still, boosters are fully warranted for this population."

Besides getting COVID-19 and other recommended immunizations for your age group, you can do a lot to bolster your immune system and keep it healthy as possible. Here are some reasons your immune system weakens and then proactive ways to support it.

AGING EFFECT IS REAL

Your immune system keeps your body healthy by warding off foreign substances. Harmful invaders include bacteria, viruses, fungi and cancer cells. The immune system battles back through a complex network of blood cells and bodily organs. Lymph nodes are glands that harbor, then release, specialized white blood cells called lymphocytes. Lymph and blood vessels transport the infection-fighting lymphocytes throughout the body.

"Your age is the primary determinant of what's going to happen to your immune system," says Philippa Marrack, a researcher, professor and chair of immunology and genomic medicine at National Jewish Health in Denver.

The bottom line is that your immune system is just not as robust as it used to be, Marrack explains. As a consequence, it takes longer for your body to figure out when you have an infection. Once detected, it takes longer for the immune system to deal with it, as there are fewer white blood cells to respond, and your body starts losing the race between bacteria or viruses. You get sick more often. Infections are more severe and more of a threat than when you were younger, and you recover from them more slowly.

Vaccinations are key for protecting you from infection. However, some vaccines may not work as well as they used to. As the immune system changes, autoimmune diseases like rheumatoid arthritis are more likely to occur.

Experience does confer some benefit. "When you get older, your immune system is (still) pretty good at dealing with things you've already experienced," Marrack says. "But it's the new infections that you've never experienced before that are a real problem."

One example is the West Nile virus, Marrack says. West Nile virus disease, which affects older adults more severely, was far more lethal among those over 65 than younger adults when it first came through North America at the turn of the millennium.

AGING IMMUNE SYSTEM PLUS UNDERLYING CONDITIONS

Immune-system aging increases COVID-19 risk "quite a bit," says Laura Haynes, a professor of immunology at

the UConn Center on Aging at University of Connecticut School of Medicine. "But it's not only that older adults have a less robust immune system that makes them more susceptible to COVID," she says. "The vast majority of older adults have other comorbidities that also put them at risk for COVID." These underlying conditions put people at a greater risk of severe cases of COVID-19 with longer-lasting effects.

Being overweight, having diabetes or preexisting lung conditions like chronic obstructive pulmonary disease become more common with age, Haynes notes. "So it's the perfect storm of not only changes in the immune system but also other changes that happen as you get older."

Fortunately, COVID-19 vaccination still works really well in older adults, says Haynes, who explains why the Pfizer and Moderna vaccines are so effective. "They are a much different kind of technology than, say, our seasonal flu vaccines," she says. "They're more stimulatory to the immune system. So they work much better at stimulating a protective immune response in older adults."

INFLAMMATION AND AGING

Inflammation is part of the body's normal response to an injury, infection or toxin. With chronic inflammation, however, the body's ongoing response can damage healthy cells, tissue and organs.

The combination of inflammation plus aging, sometimes called "inflammaging," can have an unfortunate impact on health. "As you get older, for most people, the level of inflammation in your entire body goes up," Haynes says. "This is due to aging, to changes in your cells as you get older."

Inflammation is a factor in a variety of conditions from heart disease to dementia, Haynes says. "It's probably related to pretty much every disease of aging you can think of," she says. Increased inflammation could be at the root of age-related changes in physical function and reduced mobility, she adds. Inflammation can also impact how the immune system responds to a vaccine or an infection: "And that might make the response be not as protective as it would be in a younger person."

Within the cells, a phenomenon called "cellular senescence" is likely responsible for inflammation that comes with aging, Haynes says. "Normally, in a younger

person, cells that are old and have accumulated defects because of their age are rapidly cleared from the body," she explains. "As you get older, it doesn't happen as efficiently – and so the cells hang around. They produce and generate more inflammation."

WHAT YOU CAN DO

Vaccinate, vaccinate, vaccinate. That's the first line of defense against common infections such as flu and pneumonia. Getting adult vaccinations according to recommendations is the best way to protect yourself from infectious diseases, Marrack emphasizes. One example is shingles – a painful, persistent infection that tends to prey on seniors.

"Shingles is caused by the chickenpox virus hiding away in our nerve cells ever since we got chickenpox when we were young," Marrack says. An intact immune system keeps the virus under control, sometimes for decades. However, she says, "As your immune system gets less effective, it can come popping out."

Vaccination against the varicella zoster virus, which causes shingles, is recommended for adults over 50, according to the Centers for Disease Control and Prevention. Shingrix, now the only shingles vaccine approved in the U.S., is highly effective at preventing shingles even in adults in their 80s and 90s.

Most people should receive yearly flu shots. Special formulations are targeted just for older adults. The Fluzone High-Dose Quadrivalent vaccine is one. "That has more of the flu antigens in it than the standard-dose vaccine, which younger adults get," Haynes explains. "It's more concentrated." FLUAD Quadrivalent, the standard yearly flu vaccine with an adjuvant added to boost protection, is also approved for people 65 and older.

Pneumococcal vaccines are advised for adults over 65 to prevent pneumonia and related conditions. In addition, you may need periodic booster shots for tetanus or other conditions, depending on your health history. Work with your health provider to stay on top of immunization schedules.

"You need to get your vaccines," Haynes says. "There's a lot of talk about natural immunity: letting your immune system fight off whatever infection you get. When you're older that's really a bad idea because your immune system is just not going to be up to the task on

its own. So it's even more important for older folks to get the vaccines that their doctor recommends."

Beyond vaccination, masks, avoidance of crowded spaces, good sleep, diet and exercise help older adults protect themselves to mitigate their higher infection risk, Nikolich-Žugich says.

A healthy immune system is closely tied to your overall health. Avoiding obesity and keeping chronic conditions like diabetes under control reduces immune-system stress.

"The one big thing that keeps people younger – and it's been shown over and over again, in study after study – is exercise," Haynes says.

For instance, a March 2018 study highlighted the importance of exercise to counter aging. A team made up of 125 male and female cyclists, ages 55 to 79, was compared to a control group of older adults who did not exercise regularly. The cyclists not only had intact strength and muscle mass, but also possessed immune systems equal to those of much younger adults.

Good nutrition from eating a balanced diet also keeps your immune system strong. On the other hand, smoking is as bad for your immune system as it is for your lungs. Heavy alcohol use or binges can compromise immunity as well. Sleep disorders like sleep apnea can also lower immunity, so seek treatment if needed.

HOPE FOR A STRONGER IMMUNE SYSTEM

A growing body of research is looking at aging's effect on the immune system. "The main recent realization is that some immune (lymphoid) tissues, such as the lymph nodes, age earlier than we thought," Nikolich-Žugich says. "The aging of lymph nodes is critical to impaired maintenance and function of the immune cells. Lymph nodes are specific parking grounds where immune cells, particularly T and B lymphocytes, are maintained (and) where they react to infection. So, losing lymph node function is a pretty nasty proposition. There may be ways to reverse that loss, but this work is still in early stages."

In his own laboratory, Nikolich-Žugich's team is working to understand how to reinvigorate white blood cells that are critical to immune function. Another challenge

is restoring coordination throughout the immune system so that infection-fighting cells can meet microbial challenges in time.

One potential treatment track is medications such as rapamycin and metformin, which have shown age-delaying and anti-inflammatory effects in animal studies. "This is a big area of research right now," Haynes says. "And there are a lot of companies trying to generate the perfect drug."

Certain experimental drugs are currently being evaluated for their ability to rid the body of worn-out cells that accumulate and cause harm. "What people are looking at now is the use of drugs called senolytics," Haynes says. "These will clear the senescent cells. In animal models, they've been shown to be really efficacious in restoring physical and metabolic function in old mice." The next step is happening: Clinical trials are now being conducted in people.

"The process of aging is inevitable, but it is also plastic – it can be modulated and delayed," Nikolich-Zugich says. "This is also true for immune aging, and there are many interventions to improve the function of the immune system that are candidates to be tested in humans." ●

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APA APOLOGIZES FOR ITS CONTRIBUTIONS TO RACISM: HERE'S WHAT IT MEANS

By Joseph Andrea Rice

The American Psychological Association has issued a formal apology for its role in promoting and perpetuating racism in the field of psychology in the United States.

The APA passed two resolutions for dismantling systemic racism, pledging to take action to advance health equity in psychology.

Though the apology was a long time coming, the APA acknowledges that it's a step toward action, reconciliation, healing, and change.

In October 2021, the American Psychological Association (APA) issued a formal apology to People of Color in the United States, acknowledging its contributions to systemic racism.

The resolution, adopted by the APA Council of Representatives, is part of a larger effort to review policies and practices that will hold the organization accountable and promote health equity and diversity in the field of psychology.

In a second resolution, the APA identified psychology's role in helping to dismantle systemic racism in other sectors and settings (i.e., childhood and education; science; healthcare; work and economic opportunities; criminal and juvenile justice; and government and public policy) by adopting anti-racist practices.

"We're examining all our work going forward through the lens of anti-racism," Maysa Akbar, PhD, a clinical psychologist and chief diversity officer at the APA, wrote in an email.

WHY IS THE APA APOLOGIZING IN 2021?

The APA states that its lengthy process for issuing an apology was intentional.

"It took time to develop all the steps necessary for APA not only to apologize but to lay the groundwork for actions aimed at reconciliation and healing," Akbar said. "Work on these resolutions began in 2020, as APA confronted a very disturbing time in our nation's history."

In February 2021, the APA Council of Representatives adopted a resolution defining racism, followed by a historical chronology that examined psychology's role in racial hierarchy. The chronology details harm done by the APA and psychology against Communities of Color.

"The difference between 2020 and 2021 is not as important as the difference between 1850 and 2021, and how long it's taken us to have this critical conversation," trauma psychologist Wisdom Powell, PhD, director of the Health Disparities Institute and associate professor of psychiatry at UConn Health, said in an interview with Psych Central.

Powell, who also chairs the APA's Health Disparities in Boys and Men Working Group, said the APA's approach to addressing anti-racism with actionable commitment is more impactful than an apology on its own.

"The death of George Floyd set in motion one of the most significant racial reckonings of our time, and many leaders were moved to say something following that tragic loss to our nation — but many haven't followed up with any action," Powell said.

Still, other psychologists feel the APA's apology was overdue. "While an acknowledgment of the APA's legacy of racism is a necessary first step, the apology is insufficient," Antoinette Wilson, PhD, assistant professor of psychology at the University of Houston Downtown, wrote in an email. Wilson's research focuses on how racial typicality impacts in-group belonging and discrimination.

Wilson expressed concern over whether the APA's stated intentions would be followed with measurable change.

"I'm looking forward to seeing these resolutions in action," Wilson said in an email. "Without this, we are left with yet another symbol meant to placate those who've been oppressed, which may be just as damaging and impede meaningful progress toward equity and justice."

HOW DOES THE APA PLAN TO REDUCE HEALTH AND RACIAL INEQUITIES IN PSYCHOLOGY?

According to Powell, eradicating racism within the healthcare system will require interventions at the systemic level. "You have to change the system to change the behavior," Powell said.

"In our strategies to address racism, we have to get to the root of how we're shaping the field. Without that, evidence-based therapies or interventions will be flawed, imbued with the residue of racial bias that has permeated our field for a long time," she added.

Here's how the APA intends to reshape key systems both within and outside the field:

Healthcare. Educators of psychologists and other mental health professionals will address the limitations

of knowledge within the field derived from white supremacist ideologies.

Criminal justice. Psychologists and criminal and juvenile justice agencies will work together to develop anti-racist policies and practices and will advocate for eliminating the disproportionate criminalization and punishment of People of Color.

Education. Psychologists-in-training will be educated about the field's historical contributions to racism. Educators will be trained to help raise awareness and mitigate biases that negatively affect the learning and development of students of color.

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DIVERSIFYING THE FIELD OF PSYCHOLOGY

Racial inequities exist in psychological research, education, and practice.

"We have a lot more work to do to diversify the field," Powell said. "Not just in terms of racial and ethnic minorities, but expanding to include all of the individuals who make this nation such a culturally rich place."

To diversify a predominantly white field, the APA will prioritize educational pathways and opportunities for workforce development for psychologists of color and advocate for increased research funding and opportunities for scholars of color.

"We're woefully understaffed by racial and ethnic minority males in the field of psychology," Powell said. "We have a lot more work to do to grow their representation in a field that desperately needs them."

Wilson noted the visible effect of white-centric curricula in the demographics of practicing psychologists. "Only 4% of psychologists are Black and 86% are white," Wilson said.

DIVERSIFYING SCIENTIFIC RESEARCH

Racial diversity is lacking in psychological research samples. The APA will work with scholars to obtain study samples that are representative of populations of

color, resulting in broader findings beyond white, middle-class, college-educated individuals.

In addition, policies and practices (i.e., grant proposals and publications) used in peer-reviewed science will be evaluated.

DIVERSIFYING EDUCATION

According to Wilson, one of the most damaging aspects of the APA's history of racism and oppression has been the reinforcement of a curriculum that values and centers whiteness and devalues and ignores other groups.

"The effect this has in education is that we have students who read studies comprised of participants who do not look like them and may not reflect their lived experiences, and textbooks that often center on dominant perspectives and regulate discussion of People of Color to special sections at the end of a chapter," Wilson said.

In addition, there must also be increased funding for minority fellowship programs, like those offered by the APA. Powell attributes a portion of her success as a psychologist to subsidized programs such as these.

"It helped facilitate my entry into a field as a first-generation doctoral student," she said. "When you look at the numbers of PhD graduates in psychology, they haven't really changed much since the '70s."

Wilson said that investing in minority fellowship programs sends an important message that minority students are valued and belong.

"We must increase the diversity of graduate students, practitioners, and professors and enact policies that show their presence and work is valued and supported," Wilson said, adding that publishing and widely promoting the work that minority students produce is also vital to promoting equity and inclusion at the educational level.

DIVERSIFYING PRACTICE

The APA will seek federal funding to train psychologists from underrepresented groups to work in underserved communities.

Another way forward, according to Powell, is to incentivize paraprofessional opportunities for growth in

the field that don't require a 5-year (or more) commitment to obtain an advanced degree.

"There are many paths to becoming a therapist," Powell said. "We have to get creative — particularly in the aftermath of a powerful pandemic overlapping with an uptick in racialized violence, which has created a shadow mental health crisis in our nation."

TRAINING CULTURALLY COMPETENT PSYCHOLOGISTS

The APA will educate psychologists on biases and inequitable systems, emphasizing the cultural perspectives and needs of People of Color.

"We will develop standards for research, education, and practice that will help to dismantle systemic racism and imbue the discipline of psychology with respect and fairness for all," Akbar said.

LOOKING AHEAD

The key to dismantling racism and healing racial trauma, according to Powell, is to remember, resolve, and reassemble the history and the truth of what happened, move forward with sustained action, and carry out that commitment across generations.

"That's what it would take for us to achieve the kind of radical healing the APA's apology is moving us toward," Powell said. "I believe in the capacity for human beings to heal, grow, and thrive."

Attaining racial justice in any system won't happen overnight. It's going to take everyday acts at the individual level to press those in positions of power to instill structural, systemic change. Systems are made up of individuals, and each of us is part of a system.

"Truth and reconciliation go hand in hand; it has to be an ongoing deliberative process," Powell said. "It's not just a one-time apology — it requires a commitment to revisiting those cumulative wounds across history, over time and generations until the work is done. When we actually heal our nation, from centuries of racial divisiveness, everybody will benefit — everyone gets healed." ●

School of Business

STUDY EXAMINES HOW U.S. COMPANIES' OVERSEAS EMPLOYEES OFFER THEM U.S. TAX BENEFITS

BY Joseph Brazel

U.S. corporations with a high percentage of employment in foreign countries experience more tax benefits, according to a study forthcoming in *The Accounting Review*.

In an article titled “Foreign Employment, Income Shifting, and Tax Uncertainty” researchers analyzed the relation between the location of employees at large U.S. multinational companies and income shifting activities, a particularly aggressive form of tax planning. The article is authored by Katharine Drake of the University of Arizona, Nathan Goldman from North Carolina State University, and Frank Murphy of the University of Connecticut.

“We were interested in how tangible investments, such as employment, affect tax planning activities. Companies like Caterpillar have recently been scrutinized by Congress over whether their employees' location aligns with where they report their income. We were interested in understanding these companies' tax benefits,” says Goldman.

In the study, the researchers describe how U.S. multinational companies can differ in where they place employees and how this can alter tax planning opportunities. For example, a company with employees in the U.S. and France has different opportunities and incentives to shift income than a company with employees in the U.S., France, Ireland, and a tax haven country like the Cayman Islands.

The research team used financial statement disclosures of employment information to create a sample of 6,641 observations across 815 unique large U.S. multinational companies. Using this information, they determined whether companies had higher or lower foreign employment relative to their foreign operations.

For those companies with more foreign employment, they found that these companies shifted more income out of the U.S. The study estimates that companies with higher than expected foreign employment shift \$69 billion more in income out of the U.S. than companies with lower foreign employment.

“We find that taxes must be a consideration as companies globalize. Sure, there are non-tax considerations that may be the driving factors on where and to what extent companies expand into new countries. However, our findings suggest that there are significant tax benefits associated with having employees in these lower-taxed countries, and these benefits must be considered when assessing the viability of such a large investment,” advises Goldman.

The study then considers how foreign employment is related to tax uncertainty, or the likelihood a company must reserve for its aggressive tax planning activities in its financial statements. It finds that companies with high foreign employment have less tax uncertainty related to their foreign operations than those with less foreign employment.

“The IRS can overturn tax positions lacking economic substance. Our findings suggest that companies can use foreign employment to generate that economic substance, validating their aggressive tax planning activities in the eyes of the IRS,” says Goldman.

Goldman concludes, “Recent tax reforms, like the Tax Cuts and Jobs Act of 2017, place an even greater emphasis on having economic substance for multinational tax planning. Our study suggests that tax benefits generated from shifting income from a high tax to a lower tax jurisdiction and incurring lower tax uncertainty while doing so can be meaningful factors as companies continue their overseas expansion. And, for companies already overseas, they should evaluate whether there are opportunities available to them to generate these benefits that they are not already using.” ●

UCONN BIZ PROFESSOR SCORES \$2.5M FANTASY FOOTBALL WIN ON CONCEPTS HE TEACHES

By Sean Teehan

A University of Connecticut business professor's students may start paying closer attention in class after he won \$2.5 million in fantasy football using data analytics techniques he teaches.

David Bergman, a UConn School of Business professor who specializes in data science and business analytics, won a DraftKings Daily Fantasy Sports World Championship last weekend. He came out first in a field of 200 football bettors, who each selected a collection of nine NFL players to try to outscore the other opponents' picks.

Bergman, who has published articles on data-driven optimization and sports analytics in top journals, says part of his success was in selecting three players outside the typical tournament favorites, allowing him to distinguish his entry and rise through the ranks.

"To me, it's a very cool math problem," Bergman said. "Top-ranked players might use a combination of game theory, predictive modeling, machine learning and optimization for selecting entries. Of course, on any particular day, you're also flipping a coin; there's always luck involved."

Bergman's victory is the most lucrative application of the concepts he teaches, but it's not the first. In recent years he's used modeling to help friends make seating arrangements at weddings using data about guests, and to help organize a fundraiser for a nonprofit at Yankee Stadium in New York.

While sports betting isn't legal in Connecticut, a state budget passed in 2017 by former Gov. Dannel Malloy included a fee on fantasy sports betting, which amounted to de facto legalization of fantasy sports. ●

DOES 'DEPLATFORMING' WORK TO CURB HATE SPEECH AND CALLS FOR VIOLENCE? 3 EXPERTS IN ONLINE COMMUNICATIONS WEIGH IN

By Jeremy Blackburn, Robert W. Gehl, and Ugochukwu Etudo

In the wake of the assault on the U.S. Capitol on Jan. 6, Twitter permanently suspended Donald Trump's personal account, and Google, Apple and Amazon shunned Parler, which at least temporarily shut down the social media platform favored by the far right.

Dubbed "deplatforming," these actions restrict the ability of individuals and communities to communicate with each other and the public. Deplatforming raises ethical and legal questions, but foremost is the question of whether it's an effective strategy to reduce hate speech and calls for violence on social media.

The Conversation U.S. asked three experts in online communications whether deplatforming works and what happens when technology companies attempt it.

"Sort of, but it's not a long-term solution." [Jeremy Blackburn](#), assistant professor of computer science, Binghamton University

The question of how effective deplatforming is can be looked at from two different angles: Does it work from a technical standpoint, and does it have an effect on worrisome communities themselves?

DOES DEPLATFORMING WORK FROM A TECHNICAL PERSPECTIVE?

Gab was the first "major" platform subject to deplatforming efforts, first with removal from app stores and, after the Tree of Life shooting, the withdrawal of cloud infrastructure providers, domain name providers and other Web-related services. Before

the shooting, my colleagues and I showed in a study that Gab was an alt-right echo chamber with worrisome trends of hateful content. Although Gab was deplatformed, it managed to survive by shifting to decentralized technologies and has shown a degree of innovation – for example, developing the moderation-circumventing Dissenter browser.

From a technical perspective, deplatforming just makes things a bit harder. Amazon’s cloud services make it easy to manage computing infrastructure but are ultimately built on open source technologies available to anyone. A deplatformed company or people sympathetic to it could build their own hosting infrastructure. The research community has also built censorship-resistant tools that, if all else fails, harmful online communities can use to persist.

DOES DEPLATFORMING HAVE AN EFFECT ON WORRISOME COMMUNITIES THEMSELVES?

Whether or not deplatforming has a social effect is a nuanced question just now beginning to be addressed by the research community. There is evidence that a platform banning communities and content – for example, QAnon or certain politicians – can have a positive effect. Platform banning can reduce growth of new users over time, and there is less content produced overall. On the other hand, migrations do happen, and this is often a response to real world events – for example, a deplatformed personality who migrates to a new platform can trigger an influx of new users.

Another consequence of deplatforming can be users in the migrated community showing signs of becoming more radicalized over time. While Reddit or Twitter might improve with the loss of problematic users, deplatforming can have unintended consequences that can accelerate the problematic behavior that led to deplatforming in the first place.

Ultimately, it’s unlikely that deplatforming, while certainly easy to implement and effective to some extent, will be a long-term solution in and of itself. Moving forward, effective approaches will need to take into account the complicated technological and social consequences of addressing the root problem of extremist and violent Web communities.

“Yes, but driving people into the shadows can be risky.”

Ugochukwu Etudo, assistant professor of operations and information management, University of Connecticut

Does the deplatforming of prominent figures and movement leaders who command large followings online work? That depends on the criteria for the success of the policy intervention. If it means punishing the target of the deplatforming so they pay some price, then without a doubt it works. For example, right-wing provocateur Milo Yiannopoulos was banned from Twitter in 2016 and Facebook in 2019, and subsequently complained about financial hardship.

If it means dampening the odds of undesirable social outcomes and unrest, then in the short term, yes. But it is not at all certain in the long term. In the short term, deplatforming serves as a shock or disorienting perturbation to a network of people who are being influenced by the target of the deplatforming. This disorientation can weaken the movement, at least initially.

However, there is a risk that deplatforming can delegitimize authoritative sources of information in the eyes of a movement’s followers, and remaining adherents can become even more ardent. Movement leaders can reframe deplatforming as censorship and further proof of a mainstream bias.

There is reason to be concerned about the possibility that driving people who engage in harmful online behavior into the shadows further entrenches them in online environments that affirm their biases. Far-right groups and personalities have established a considerable presence on privacy-focused online platforms, including the messaging platform Telegram. This migration is concerning because researchers have known for some time that complete online anonymity is associated with increased harmful behavior online.

In deplatforming policymaking, among other considerations, there should be an emphasis on justice, harm reduction and rehabilitation. Policy objectives should be defined transparently and with reasonable expectations in order to avoid some of these negative unintended consequences.

“Yes, but the process needs to be transparent and democratic.”

Robert Gehl, associate professor of communication and media studies, Louisiana Tech University

Deplatforming not only works, I believe it needs to be built into the system. Social media should have mechanisms by which racist, fascist, misogynist or transphobic speakers are removed, where misinformation is removed, and where there is no way to pay to have your messages amplified. And the decision to deplatform someone should be decided as close to democratically as is possible, rather than in some closed boardroom or opaque content moderation committee like Facebook's "Supreme Court."

In other words, the answer is alternative social media like Mastodon. As a federated system, Mastodon is specifically designed to give users and administrators the ability to mute, block or even remove not just misbehaving users but entire parts of the network.

For example, despite fears that the alt-right network Gab would somehow take over the Mastodon federation, Mastodon administrators quickly marginalized Gab. The same thing is happening as I write with new racist and misogynistic networks forming to fill the potential void left by Parler. And Mastodon nodes have also prevented spam and advertising from spreading across the network.

Moreover, the decision to block parts of the network aren't made in secret. They're done by local administrators, who announce their decisions publicly and are answerable to the members of their node in the network. I'm on scholar.social, an academic-oriented Mastodon node, and if I don't like a decision the local administrator makes, I can contact the administrator directly and discuss it. There are other distributed social media systems, as well, including Diaspora and Twister.

The danger of mainstream, corporate social media is that it was built to do exactly the opposite of what alternatives like Mastodon do: grow at all costs, including the cost of harming democratic deliberation. It's not just cute cats that draw attention but conspiracy theories, misinformation and the stoking of bigotry. Corporate social media tolerates these things as long as they're profitable – and, it turns out, that tolerance has lasted far too long. ●

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UConn Experts Forecast Hot Funding Market for Startups

By Lisa Klein

Startups seeking funding can cash in right now from a market flush with capital and seeking promising ventures, a panel of UConn experts said Wednesday.

"If you hit it right, it's a great time to raise money because there's quite a bit out there," said Konstantine Drakanokis, a venture capital investor and member of UConn's Entrepreneur-in-Residence program. He spoke as part of a discussion on financing mechanics for emerging businesses.

"This is going to be a very strong year from every indication that I see," agreed Eric Knight, a serial entrepreneur and angel investor.

Many venture capital firms have spent the pandemic amassing huge pools of money that will fund up to a decade's worth of investments, said Mostafa Analoui, executive director of venture development for UConn's Technology Commercialization Services.

Valuations of startups have also risen because of the cheap money and "irrational exuberance," Analoui said. "The question is is this sustainable or not," he said, adding that the U.S. is benefiting at present from the pandemic's asymmetrical impact on global markets.

But emerging companies can benefit from the exuberance, Analoui said. "At the ground level, for those raising money, there is plenty of cash and interest from investors to go after."

The ongoing COVID-19 pandemic also presents an opportunity for fledgling companies to show investors that they are resilient and resourceful, Knight said. "It really stress-tested companies under real harsh, unexpected circumstances. I look favorably on those companies that had the resilience, in some cases the business creativity and pivots, to emerge and still be in growth mode with their businesses."

In addition, the pandemic has jump-started technologies like video-conferencing that have allowed companies to be more efficient and nimble, Knight said. “The teams that made it through the pandemic came out a lot stronger and more creative,” he said.

Entrepreneurs need to be aware of a constantly changing marketplace and be sure to do in-depth study of their customers, the panel advised. Hot sectors right now include cleantech — or products and services with reduced environmental impact — and anything to do with infectious disease.

Two years ago investors had little interest in the infectious disease space, Analoui said. “Today, no matter what you do in the infectious disease area, you are going to be on top of the list for attention,” he added.

The speed and magnitude of these investor shifts offer a lesson for entrepreneurs, Analoui said. “It’s a very dynamic environment and you have to be very agile in responding to those market changes.” ●

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NEW UCONN COOP PROGRAM AIMS TO BREED NEXT GENERATION OF ENTREPRENEURS

By Sean Teehan

A pilot coop program at UConn’s Stamford campus this fall will train students interested in entrepreneurship how to develop new products, while hopefully creating intellectual property like prototypes and patents.

Students working for the program will take one or two semesters off from academic work to live on UConn’s Stamford campus, where they will be paid as full-time employees by the university’s Werth Institute for Entrepreneurship and Innovation.

If it’s successful, there are plans to bring the program, dubbed the Stamford Startup Studio, to UConn’s Hartford campus next, officials said. The overall goal is

to provide students with real-world experience in developing a product as a startup company, and it dovetails with the state’s efforts to build more vibrant startup communities in its major cities, including Stamford, Hartford and New Haven.

The Werth Institute — which was established in 2017 with a \$22.5 million donation from Woodbridge businessman Peter J. Werth — is running the program, which is backed in part by a \$2 million state grant.

“Throughout the experience, they’ll be building competencies in design, engineering, product management, and the entrepreneurial mindset,” said Tara Watrous, head of entrepreneurial transformation at Werth, who is leading the pilot program.

The model differs slightly from traditional coops in which students work for an outside company, because Stamford Startup Studio pupils are essentially employees of the Werth Institute, said David Noble, the institute’s director. Werth will pay their salaries and students get free housing on the UConn Stamford campus.

Students in the program will be tasked with finding innovations in the construction and real estate industries, Watrous said, but future incarnations could focus on other sectors. She and Noble said they’re finalizing partnerships with major national construction and real estate firms that will provide industry problems for students to solve, and guidance on whether the ideas are appealing.

“It’s not going to be small, localized contractors,” Noble said. “It’s going to be the much bigger companies; multibillion-dollar companies.”

Early in the semester students will attend and participate in workshops, job shadows and one-on-one sessions with industry consultants to build a foundational knowledge of the real estate and construction industries, Watrous said. Later, corporate partners will co-create business case problems that students will work on in two-week sprints to develop early-stage prototypes. They will also work with experts like venture capitalists on product pitches, and possibly try to sell their ideas to prospective investors.

As a hypothetical example, a real estate company partner might say there is a common issue with an aspect of the escrow process, and students would try to

figure out a way to use technology (maybe by developing a mobile pay system) to solve it.

Eight pupils, whose majors range from business and engineering to human development and family studies, out of 17 applicants have been chosen for the pilot, Watrous said. Throughout the coop, startup entrepreneurs from UConn's Technology Incubation Program (TIP) will mentor students.

Solange Wright, a senior digital media and applied communications major, will be participating in the program this fall. She said her ideal career would be in web design or development, and she thinks the coop will help her develop new tech skills, and prepare her to pitch ideas.

"I'm excited to work there and start pitching ideas to people," Wright said. "I think the experience is going to be invaluable in that sense."

INNOVATION ECOSYSTEM

In a best-case scenario, the program could also grow to be an important cog in Connecticut's efforts to create robust innovation economies in Stamford and Hartford, Noble and Watrous said. Major higher-education institutes typically anchor geographical areas known for startups, such as Stanford University in California's San Francisco Bay Area, or MIT in Cambridge, Mass.

That aspect of the program gels with efforts in Hartford to draw entrepreneurs to the city through things like startup incubators and accelerator programs.

"From a city perspective it's a really great way to create an innovative ecosystem that serves more than just the students," Watrous said.

The program also makes sense for UConn because students and parents are increasingly demanding work-based learning that connects pupils with employers, said Anthony Carnevale, director of Georgetown University's Center on Education and the Workforce.

"If [a college or university] wants to survive and prosper in higher education and remain competitive, they've got to pursue something like this," Carnevale said.

"Foundation money [for such programs] can be the best route."

Metrics to judge the pilot program aren't completely clear, but Watrous said it will depend in part on what students are able to do after it ends.

"Success looks like placing students in very competitive [jobs], roles they wouldn't be able to obtain if they had not gone through this experience," Watrous said. "Can we sell the IP? Can we launch startup teams? Can we send startup teams to the [TIP] accelerator?" ●

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ON JUNE 1, 2021

OPINION: UCONN INNOVATION PROGRAM KEY TO JOB CREATION, GRADUATE RETENTION IN THE STATE

By Michael A. Cantor

Entrepreneurship and innovation hold the keys to job creation, wealth creation and a bright economic future for Connecticut. The COVID-19 pandemic has seen a resurgence of millennials and other young people moving back to Connecticut. It is critical that we take advantage of this opportunity to grow the economy and secure our future. We believe that UConn is the linchpin in this effort.

Currently a bill sits in front of the state Legislature, SB 1099, "An Act Authorizing Bonds Of The State For A Research Faculty Recruitment And Hiring Program By The University Of Connecticut To Encourage The Creation Of New Business Ventures," that would allow UConn to hire 10 new "innovation professors," who would be specifically recruited for their track record of turning their research and discoveries into new technologies, products and companies. This innovative new program would encourage entrepreneurship among our faculty and their students, leading to new ventures, new patents, job creation and immeasurable opportunity. Such a visible commitment by the state and the university would further attract top-notch faculty and students, excited to become Huskies and take part in groundbreaking research and innovation.

It is not speculation that this approach works. Connecticut already has a demonstrated record of success. For example, UConn's Technology Incubation Program with labs and offices in Farmington and Stamford, has incubated, helped to grow and supported over 50 start-up companies, all of which are strategically aligned with the technologies and industries that support Connecticut's economy now and in the future.

These companies are on the cutting edge of advanced materials, medical devices, software, biotech and pharma. They have raised hundreds of millions of dollars, filed and issued hundreds of patents, created hundreds of jobs and will certainly be the source of thousands of the future jobs that will attract young people and others to Connecticut from throughout the United States.

Just a few of the many TIP companies that are raising money and creating Connecticut jobs include Rallybio, Azitra, Carogen, Shoreline Biome, LambdaVision and Torigen. In addition, as they grow, many TIP companies are supported by the state's venture capital firm Connecticut Innovations. As the board chair of CI, I know that UConn generally, and TIP in particular, are fertile sources for creative and important Connecticut startups that will figure prominently in the future of a growing Connecticut economy.

State investment has been crucial to UConn's growth and continued success. This spring, a record 38,000 students applied to UConn, nearly 2,000 more than applied this time last year. And this fall, the university welcomed its most diverse freshman class ever. We as a state must continue to build on this success. National benchmarking reveals that UConn's current research faculty numbers are substantially smaller than our peers. An investment in 10 new "innovation professors" is exactly what is necessary to fill this gap and allow UConn to continue to be a key economic driver in the state.

We should all be immensely proud that 73 percent of UConn's in-state graduates stay in Connecticut, going on to live, work and contribute to various communities across the state. Of the out-of-state student body, 22 percent stay here in Connecticut. Given the tremendous geographic diversity of the student body, nearly a quarter of out-of-state student retention is an

impressive start. But we know the state can do more to attract and retain the next generation of talent.

It is this sort of innovative program that presents the opportunity for the state to make a high-yield investment in not just the future of UConn, but the future of Connecticut. ●

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NEW UCONN ROBOTICS PROGRAM AIMS TO HELP BUILD MANUFACTURING WORKFORCE OF THE FUTURE, SPUR NEW STARTUPS

By Matthew Broderick

As manufacturers across the state look to increase production and competitiveness through automation and cognitive computer and artificial intelligence — a sector evolution known as the fourth industrial revolution or Industry 4.0 — the state's flagship university, UConn, is trying to help create a pipeline of talent with a new robotics major starting in the fall of 2022.

John Chandy, head of UConn's electrical and computer engineering department, which will oversee the robotics coursework, says the program will incorporate the disciplines of electrical engineering, computer engineering, mechanical engineering and computer science.

UConn is one of only two U.S. research-active universities to offer a robotics major. While the school has a history of robotics research among engineering faculty, which has transferred to companies or fueled startups, Chandy says one of the goals is to get new robotics majors thinking about business opportunities.

"Even at the freshman level, we need to change the mindset," Chandy said. "Many [engineering] students come in thinking about [getting] a stable job at a big

company [after graduation], but we want them to think about entrepreneurship as an option.”

And the robotics job market is heating up. The U.S. Bureau of Labor Statistics projects 9% job-market growth for robotics engineers between 2016 through 2026 with an average salary of \$81,000. The global robotics market is projected to grow 26% annually to just shy of \$210 billion by 2025, according to Statista, a market research firm.

PANDEMIC BOOSTS AUTOMATION

Those numbers don’t surprise Ron Angelo.

As president and CEO of the Connecticut Center for Advanced Technology (CCAT), Angelo’s organization works with nearly three dozen global industrial companies and thousands of supply chain manufacturers across the state.

“We listen and get feedback from [employers] about what’s most important [to them] and that is advanced design automation, robotics for inspection and quality control, and additive manufacturing,” Angelo said, noting CCAT recently modernized its three East Hartford-based training facilities to align with manufacturers’ growing technology needs.

And COVID has only quickened the drive for automation. National data from Westmonroe, a digital technology company, found that manufacturers digitized many activities 20 to 25 times faster last year because of the pandemic, prompted by the need to move at faster speeds as they adjusted to constraints with their workforce, suppliers and customers.

Additionally, the report noted that 82% of manufacturers surveyed have implemented, piloted or are considering Industry 4.0 technology.

As component parts for robots — like cameras, sensors, lasers, and scanners — become less expensive, the overall cost of robotic automation has dropped, too, says Jim Mail, regional sales manager for ABB Robotics, one of the world’s leading robotics and machine automation suppliers that sells to Connecticut-based companies.

That’s enabled small and mid-sized businesses to incorporate more automated technology.

“As costs have gone down, the return on investment has gone up,” Mail said.

One of the fastest growth areas in robotics is in distribution logistics and warehouse automation. Amazon, for example, uses robots to move massive amounts of inventory at its warehouses, including in Connecticut.

Swedish lockmaker ASSA ABLOY uses various robotic and automated technologies at its Berlin manufacturing plant on Episcopal Road. That includes cobots, or collaborative robots that operate alongside workers to perform actions that don’t require the skill of a human.

For example, a cobot equipped with grippers picks up a mortise lock body from another fabrication process and sends it to a line worker who performs late-stage assembly or lock customization.

Today, Mail says, machines are being designed with artificial intelligence and machine-learning capabilities, so they can not only pick up an object, for example, but distinguish among various factors, like different bar codes.

“There are vision systems [with some robots] that help [the machine] make decision-tree type decisions,” he said.

UPSKILLING WORKERS

Another advantage of automation, Mail says, is it allows companies to use machines to handle mundane, repeatable work and upskill employees to perform higher-level tasks.

Such upskilling is a major focus and concern in the manufacturing industry, especially in Connecticut, which continues to face a workforce shortage. There are thousands of available jobs in the industry today.

The Advanced Robotics for Manufacturing Institute, of which UConn is a member, notes the lack of continual re-skilling as one of the sector’s top challenges, along with a U.S. educational system that is insufficient for advanced manufacturing careers.

CCAT’s Angelo understands those challenges. He says programs like the First Robotics Competition, a nationwide robotics program at the high-school level, have been great, but more needs to be done at the

college level, which is why he is encouraged by UConn introducing its robotics major.

"Jobs that become available because of automation will grow exponentially in the manufacturing trade," Angelo said. "We'll need programmers and coders [in manufacturing], the type of skills that were traditionally attractive to the insurance and financial services and healthcare industries."

Chandy said he hopes UConn's newest major will help create and grow a robotics ecosystem of startups in Connecticut over time to support in-state companies.

For now, he and his colleagues in the engineering department are preparing for the first class of robotics majors next fall. He expects the program might attract 30 to 40 students in its inaugural year but is hopeful that number will swell to 300 students in the years ahead. ●

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UCONN ENTREPRENEURSHIP HEAD SEES CANNABIS AS POSSIBLE GROWTH ENGINE

By Sean Teehan

A top research and entrepreneurship official at UConn thinks the Constitution State has the opportunity to jump to the forefront of the cannabis industry's startup scene.

Abhijit (Jit) Banerjee, UConn's associate vice president for research, innovation and entrepreneurship, said he thinks state funding for a limited-time incubator for UConn staff and faculty working in the cannabis space could yield innovative companies in the emerging legal marijuana market.

UConn already has a number of faculty researchers working on projects from horticulture to genetics of cannabis, and funding an incubator would encourage

them to start companies, Banerjee said. It could also show investors that UConn cannabis startups are worth seeding.

"Just imagine that if we had a dedicated incubator with a program that is leading only to cannabis and cannabis-related companies," Banerjee said. "You're automatically influencing the investors to say, 'let's go to UConn, because now they have infrastructure, they have the dedicated incubator, they have everything there.' "

Banerjee said he thinks if the Department of Economic and Community Development (DECD) and quasi-public entrepreneurship booster, CTNext, created a \$5 million startup fund for UConn cannabis researchers the state could see a slate of serious, innovative marijuana-related companies emerge from the university.

UConn could run the incubator for three to five years, track the program's results and then make the call on whether to continue or axe it, Banerjee said.

"What I'm asking for is a pool of money that would allow us to have a very focused investment in this particular area so that we are actually measuring the success over a period of time no more than five years," Banerjee said.

UConn is currently hosting an increasing amount of cannabis commercialization work, Banerjee said. UConn's Technology Incubation Program (TIP) is currently housing cannabis company 3BC, which isolates cannabinoids in hemp, and will soon add another industry startup, he said.

Meanwhile, UConn researchers are currently working with a major cannabis company on a project to alter plant genetics to produce cannabis with higher CBD content, said Banerjee, who said he cannot publicly identify the company.

Banerjee says eager cannabis-industry investors would be especially interested in startups out of UConn, a nationally known research university. At the same time, UConn researchers would be more willing to establish companies if they had financial backing to start them.

"It is a matter of encouraging the faculty to take that risk by saying, 'we are behind you, we are putting up the money, and we are saying that it can happen,' " Banerjee said. ●

DESPITE NEW AGE OF REMOTE WORK, EXPERTS SEE CT CITIES THRIVING

By Paul Schott

Editor's note: Miguel Cardona – President Joe Biden's choice for secretary of education – faces several urgent and contentious priorities, including

From the outside, the office buildings of Connecticut look like they did at the start of 2020. But their interiors, and life in the streets around them, reveal the impact of the global upheaval of the past 20 months.

Today, most office buildings have fewer people working in them than they did before the start of the COVID-19 pandemic because many workers are coming in less frequently or not working at all in their offices. The trend is unlikely to vanish in the next few years — or possibly ever — because many companies have realized that their employees do not need to work in their offices every day.

They have also discovered that flexible work arrangements are crucial to hiring and keeping workers.

The impact of companies' plans for office-based professionals will reverberate throughout Connecticut's economy. Since the start of the pandemic, commercial-building owners and neighboring small businesses have acutely felt the plunge in office activity — and the total volume of new leases is still down in Fairfield County.

But a number of companies' recent decisions to open new headquarters in Connecticut show that the rise of remote working has not erased the state's longstanding status as a major corporate destination. And experts say cities will not lose their appeal as cultural hubs and gathering places even as the ranks of office commuters thin.

"We've shifted to a new societal way of working globally that has to have a greater level of flexibility and trust," said Rebecca Corbin, founder and CEO of Corbin Advisors, a Farmington-based research and advisory firm focused on the capital markets that opened new

offices last year. "I'm very much open to working from home."

But Corbin added, "I also believe that there is an important element of separation of work and home. That does come from getting in your car and driving to work and having a workday and then getting in your car or on the [mass] transportation and having your home life."

NO DROP IN PRODUCTIVITY

On March 6, 2020, Connecticut recorded its first COVID-19 case. In the following weeks, office buildings emptied out across the state as companies directed their employees to work from home as the virus spread relentlessly during its first wave.

While the transition to remote working was precipitous, many businesses navigated the change with relatively little disruption to their operations.

"We all went home, and everything worked somewhat seamlessly," said Lucy Gilson, associate dean of faculty and outreach in the University of Connecticut's School of Business. "One, we knew the people on our teams. For virtual work to be successful, it's actually very important that we have some level of familiarity with the people we work with."

Video-conferencing services such as Zoom, Microsoft Teams, Google Meet, Amazon Chime and Apple FaceTime have played a crucial role in keeping professionals connected.

"We've done [remote working] in the past, even before the pandemic, so we don't feel that separation if someone is in the office or at home," said Sunil Reddy, CEO of Norwalk-based Criterion, a provider of HR-focused software. "We use all the collaboration tools and technology. With all of that, we really haven't seen any productivity differences."

Some companies have kept their offices open since the start of the pandemic through government designations as essential businesses.

"With our culture and setup, I think a lot of people work great collaboratively when they're together," said Greg Cohen, president of New Haven-based The Star Supply Co., which describes itself as New England's largest single-location HVAC and refrigeration distributor.

“We’ve shown over the past 18 months that we’re able to do that safely.”

LITTLE PUSHBACK FOR VACCINE MANDATES

Connecticut’s high vaccination rate and relatively low COVID-19 infection levels have led many companies to reopen offices in recent months — and many workers seem willing.

In October, as the Delta variant subsided, the daily number of COVID-19-related hospitalizations in the state ended at 190 and never exceeded 250, after a summertime high of 391 on Aug. 24.

“I really have had no one in recent weeks express concerns about the way their employer was requiring a return to work,” said state Sen. Julie Kushner, D-Danbury, co-chairwoman of the state legislature’s Labor and Public Employees Committee. “A lot of people are going back to work.”

And Connecticut has seen limited resistance to company-issued vaccine mandates put in place to support office reopenings. “It has not been as controversial as I think one might have expected.” Kushner said.

Many employers have reopened their offices in part because they have discovered that there are limits to all-virtual workplaces.

“Virtual teams do really well with routine tasks,” said UConn’s Gilson. “But where we struggle more in virtual teams is when work becomes complex or when it comes to more innovation and creativity. What we’re finding is that we’ve done really well — with people saying, ‘We’ve been really efficient, but have we really innovated?’ And the answer is probably not as much as we would have had we been face-to-face.”

Taking a similar view, Corbin Advisors opened new offices in Farmington in October 2020, covering about 7,800 square feet — more than four times the size of its previous offices in the same town. The firm employs approximately 50.

PERMANENT CHANGE

But office life in 2021 is hardly a doppelganger of the pre-pandemic era. A large number of offices have been

reconfigured with more spacious layouts that allow for physical distancing. At the same time, widespread acceptance of remote working means that coming into the office every day is not necessarily expected or demanded, even at companies like Corbin Advisors that have resumed in-person working.

“We have moved to and embraced at least two days in the office, with Wednesday being our ‘Corbin Connection’ day,” Corbin said. “If you want to come into the office and have that social element, Wednesday would be the day.”

Criterion reopened its offices at the Merritt 7 complex in Norwalk this past summer, but it did not require employees to return.

“As long as it works for all parties — the employees, the company and the clients — then it doesn’t matter where our employees work,” Reddy said.

A number of Connecticut-headquartered Fortune 500 firms have taken a similar approach. Stamford-based Synchrony, the country’s largest provider of private-label and store-brand credit cards, started its office reopening in June. In October 2020, it announced a policy allowing employees to permanently work from home.

“I don’t think things will ever go completely remote,” said Synchrony CEO and President Brian Doubles. “There are certainly certain activities that are better in person. And there are certain meetings and things that I think will remain virtual.”

The role of remote work has also become a key consideration in hiring decisions.

“I do get some concerned that we might not be able to attract some top talent if we don’t adapt to some of these new trends, with remote work being one of them,” said Star Supply’s Cohen. “It’s something we’re constantly looking at.”

A SLOW RECOVERY

To meet their long-term goals, commercial-building owners and many other businesses are counting on a rebound in office occupancy.

Leasing activity rises and falls sharply from one quarter to the next, driven by big deals. Fairfield County recorded about 432,000 square feet of new leases and

expansion deals during the third quarter of this year — a 27 percent improvement from the previous quarter, according to commercial real estate firm CBRE.

But the third-quarter leasing volume trailed the county's five-year quarterly average by 18 percent.

Overall, CBRE data show a significant decline in leasing activity in 2019, followed by a pandemic-sparked drop in 2020. This year is on track to surpass last year but fall well short of the 2015-19 average, depending on the leases in the fourth quarter.

The county's office availability rate, space not leased, has ticked up by a couple of percentage points since the start of the pandemic, but it has remained under 30 percent, according to several brokerages' data. The relative stability reflects the prevalence of long-term leases.

Despite the disruption of the past 20 months, the office market's long-term prospects are brightening. For one, the influx of new residents from New York City and other areas since the start of the pandemic appears to be helping the state to recruit major companies.

During a two-week span in June, tobacco giant Philip Morris International announced that it would relocate its headquarters from Manhattan to a to-be-determined location in the state; manufacturer and technology-services provider ITT disclosed that it would move its main offices from White Plains, N.Y., to Stamford; financial-technology firm iCapital Network said it would open offices in Greenwich; and real estate-focused fintech provider Tomo Networks announced growth plans for its headquarters in Stamford.

Those four firms are expected to cumulatively bring several hundred jobs to the state.

"You've got access to some of the best talent in the world right here," Gov. Ned Lamont said last month at the Greenwich Economic Forum. "I think post-COVID, people sort of like the Connecticut lifestyle... We have a lot of folks moving to Connecticut right now."

'We believe in the future of cities'

What would it mean for the life of cities, if the number of office workers on a given day were to remain flat, long-term? Many urban planners are not alarmed.

"People will commute less because they have to and more because they want to. Workers and companies

are still going to want a central meeting place," said Chris Jones, senior research fellow at the Regional Plan Association, a nonprofit focused on economic health, environmental resilience and quality of life in the New York metropolitan region.

"They're going to want to be in places where they can reach as many workers as possible. They also need to be places where people want to come because they're attractive for activities such as going out to lunch or having a drink after work."

Dining establishments are among the small businesses that are hoping for a revival in daytime office-worker populations.

Before the pandemic, said Dani Corbett, general manager of Tigin Irish Pub on Bedford Street in downtown Stamford, "In general there was lunch and happy hour business that we counted on Monday through Friday. During the holiday season, we did a fair amount of office parties as well."

Tigin has not seen that business rebound since the reopening, Corbett said. "Recently, I've noticed some of it coming back — co-workers coming to lunch or meeting after work. I would like to think that if people return to their offices we would see an uptick in business in the same areas that we had before."

As it did before the pandemic, Connecticut's ability to add and keep office-based professionals in its cities in the coming years will depend heavily on how local and state officials respond to longstanding concerns such as housing affordability, the quality of public schools, perceptions of crime and aging mass-transit infrastructure.

"The overarching point is we believe in the future of cities," said Melissa Kaplan-Macey, the Regional Plan Association's Connecticut director and vice president of state programs. "There's not a question that cities will continue to be important hubs of activity in the state, region and country." ●

AS FINTECH FIRMS RISE IN CT, UCONN TO LAUNCH MASTER'S PROGRAM TO MEET DEMAND

By Paul Schott

The University of Connecticut will launch next year a master's degree program in financial technology, an expansion that highlights the ongoing growth of fintech and UConn's business school.

The new program will combine lessons in advanced business analytics, technology solutions and financial services — paving the way for students to pursue opportunities in the financial, insurance, medical, and regulatory fields and other industries according to UConn officials.

"There's a lot of demand in the Hartford and Stamford areas for students who come out ready to take on these jobs in fintech — not just in the financial industry, but also using fintech skills in lots of other applications," said David Souder, interim director of UConn's Stamford campus and a professor in the School of Business' management department. "Local employers want to add UConn talent, particularly in areas that involve applying digital technologies in business settings."

The fintech program is scheduled to begin next spring at UConn's Hartford campus, followed by a start in the fall of 2022 at the Stamford campus. In addition, UConn plans to launch a fully online version of the program as early as 2023.

In Hartford, the fintech program is expected to have about 20 students in its inaugural class and see its enrollment increase to about 160 by the spring of 2024, according to UConn officials. In Stamford, the university expects to have 35 in the first class and grow enrollment to about 100 by the spring of 2024.

"We're really excited about what we're doing in the specialized master's space at UConn — this will be our fifth (specialized) program in the School of Business," said Meghan Hanrahan, executive director of specialized master's programs in the School of Business.

"Our portfolio is growing. We're doing work in accounting, human resource management, financial risk, business analytics and, now, fintech."

UConn officials anticipate drawing students from a wide age range, including recent graduates and experienced professionals. Professional experience is not required to be admitted to the program, which will take an average of about two years to complete, UConn officials said.

"You'll have seasoned professionals in the classroom intersecting with young, green talent," Hanrahan said.

Among other new initiatives at the School of Business, an online MBA program launched this fall.

In the current semester, about 2,800 undergraduate students and approximately 1,700 graduate students are enrolled in the business school.

"The MBA is not going away. The skills that MBA students bring to bear are relevant and will continue to be relevant," said John Wilson, the academic director of the fintech program. "What we're trying to do is appeal to a new generation of students and employees who are fascinated by technology, fascinated by digital transformation and want to bring those skills to bear in the new global economy."

FINTECH ON RISE IN CONNECTICUT

The School of Business is preparing to launch the program as fintech firms' presence continues to expand in Connecticut.

In September, iCapital Network opened offices at 2 Greenwich Plaza in downtown Greenwich. Company officials anticipate that the number of Greenwich-based employees could rise to approximately 300 during the next two years.

"We opened an iCapital office in Greenwich earlier this year because, among other reasons, Greenwich presents an opportunity to attract skilled and experienced employees, with the education and expertise that will help us deliver industry-leading technology to our clients," iCapital said in a statement provided to Hearst Connecticut Media. "The area is quickly becoming a hotbed of technology development for Wall Street. Without a doubt, we'll be looking at candidates from local universities such as UConn. It's only going to accelerate the recruiting process and

strengthen the industry if more graduates are entering the workforce having studied fintech.”

Six miles east, 2200 Atlantic St., in the South End of Stamford, houses the new headquarters of Tomo Networks, a real estate-focused fintech company that started last year. In June, Tomo announced plans to hire up to 100 local employees by the end of this year.

“Mature companies are fully familiar with us,” Wilson said. “But we do think these startups and midstage companies and ‘disruptors’ are also going to be very appealing to our student body.”

In 2019, the largest fintech firm headquartered in Connecticut, Synchrony, opened a digital technology center at UConn’s Stamford campus.

“As a company headquartered in Stamford, having the ability to connect and recruit top talent — students and alumni — from Connecticut-based universities like UConn is critical,” said Dan Murphy, senior vice president of digital engineering at Synchrony, the No. 187 firm on this year’s Fortune 500 list. “Synchrony continues to innovate on our recruiting practices to tap into diverse pipelines both locally and nationwide. We have a stake in the future of these students in an effort to grow the next generation of leaders in Connecticut.” ●

Jayabhusan Nallakannu. They were told of their first place finish on Nov. 23.

The students, all studying financial risk management, beat out a team from a university in Saudi Arabia by more than \$100,000.

Chinmoy Ghosh, head of the university’s Department of Finance, said the students’ preparation and dedication to working together helped them in the competition.

“The team was inspired not only by their classes, but by their professors who encouraged them to take their knowledge and apply it in the competition.” Ghosh said in a statement. “Employing an investment strategy that involved bold and carefully monitored risks and a sharp focus on the changing market, the team invested in a diversified portfolio of stocks ranging from vaccines to cryptocurrency. These students will certainly continue to achieve tremendous results while at UConn, and later in their careers.”

The students credited their winning in the prestigious competition to, among other things, identifying underdog companies that were responding to market demands.

The team won an award of \$3,000 to donate to a charity. They chose The Humane Society. Each student was also given an Ipad. ●

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UCONN STUDENTS TAKE TOP PRIZE IN PRESTIGIOUS 2021 BLOOMBERG GLOBAL TRADING CHALLENGE

By Robert Storace

Five Stamford-based University of Connecticut business graduate students are celebrating their victory in the 2021 Bloomberg Global Trading Challenge, in which they beat out about 500 teams from around the world.

The students, whose trading portfolio passed a Bloomberg benchmark by nearly \$470,000, are Sayem Lincoln, Justin Keish, Matt Ciaburro, Varun Katari and

NEAG School of Education

HOW U.S. EDUCATION SECRETARY NOMINEE MIGUEL CARDONA CAN STOP THE TEACHER SHORTAGE

By Bob Spires, Diane B. Hirshberg, Doris A. Santoro, and Richard L. Schwab

Editor's note: Miguel Cardona – President Joe Biden's choice for secretary of education – faces several urgent and contentious priorities, including reopening schools safely, addressing systemic racism within schools, and reversing the ever-growing teacher shortage. Here, four experts explain how to recruit more people to become educators in the nation's public schools.

1. Increase Pay and Reduce Class Sizes

Bob Spires, associate professor of education, University of Richmond

The teacher shortage has become a crisis in the United States. In 2018, there was an estimated shortage of over 100,000 K-12 teachers. Meanwhile, the demand for K-12 teaching jobs is expected to continue to increase 5% per year through 2028.

Part of the reason for the shortage has to do with pay and working conditions. On average, teachers make roughly 20% less than other college graduates, according to research from the Economic Policy Institute, a think tank that focuses on worker issues. A majority of teachers work additional jobs – either within or outside their schools – to supplement their pay.

Meanwhile, class sizes continue to grow, which teacher unions say negatively affects teachers and students, despite statements to the contrary by former Education Secretary Betsy DeVos. Peer-reviewed research bears out that smaller classes are academically, socially and economically beneficial, especially to low-income and minority students.

To curb the shortage, I believe educational leaders and policymakers must take proactive steps at the local, state and federal levels to increase pay and resources for teachers, and alleviate pressure by reducing class sizes.

2. Improve Morale and Recruit Diverse Teachers

Doris A. Santoro, professor of education, Bowdoin College

During the pandemic, teachers' work has been filled with uncertainty and anxiety. Their ways of finding meaning and value as educators have been upended through necessary safety measures that have radically altered their work.

There are no romantic "before times" for most public school educators. Before COVID-19, teachers were reporting ever-increasing levels of dissatisfaction. Schools were already facing continuing teacher shortages, with one estimate as high as 109,000 teachers working without certification in the U.S. in 2017-18. High teacher turnover both disrupts student learning and can degrade the work environment for those who remain.

These conditions may indicate the demoralization of a profession. And yet the profession could become better appreciated as a result of this pandemic. Families are learning firsthand about the demands of teaching as many students learn from home.

Significant state and local efforts are underway to recruit educators to eliminate the teacher shortage. Some of these efforts focus on attracting teachers who are Black, Indigenous or other people of color. Nationwide, only 20% of teachers identify as people of color, while the population of students of color is over 50%.

Policymakers, education leaders and teachers will need to confront the historic and current reasons for these shortages, including the mass dismissal of Black teachers and principals after *Brown v. Board of Education*, and classroom practices that leave many teachers of color feeling devalued and alienated.

3. Bring Back Joy

Diane B. Hirshberg, professor of education policy at the Institute of Social and Economic Research, University of Alaska Anchorage

For several decades now, teachers have been judged on how well their students do on standardized tests.

These efforts have led teachers to use lessons that are narrow and often scripted and that focus mostly on core subjects.

For many teachers, this has taken joy out of what they do.

Giving teachers a canned curriculum and requiring them to follow a schedule and materials developed by people from a different state – or by a big publishing house – can leave teachers feeling as if their own expertise is not recognized or valued. Also, this takes the creativity out of teaching and connecting with students, and diminishes the gratification that comes from seeing their efforts and expertise transform the lives of their students.

Reversing the teacher shortage, in my view, will require Secretary Cardona to push for a system that fosters innovation, rewards expertise in teachers' careers and uses standardized tests to inform – but not dictate – teacher practice. This requires collaboration among teacher education institutions, states and the Department of Education to transform both teacher preparation and classroom practice. It will require significant investment and patience, but I believe the payoff both for students and the economy will be profound.

4. Build Education Leadership

Richard L. Schwab, professor of educational leadership and dean emeritus, University of Connecticut

To boost student achievement and teacher morale, research shows you need highly educated and experienced school principals and district leaders.

Thriving businesses invest heavily in leadership development. They commit to training employees who show leadership potential. As in business, effective leaders in education require the right skills and proper support.

Researchers have identified five components of effective principal training programs. They include a coherent curriculum, supervised experiences, active recruiting, cohort structure and continuous engagement with participants.

Examples of programs working with local school districts to do it differently include ours at the University of Connecticut Administrator Preparation Program, University of Washington's Danforth Educational Leadership Program, University of Denver's Ritchie Program for School Leaders and the Urban Educational Leadership Program at the University of Illinois at Chicago. They are highly selective and seek to recruit high-potential district educators. Their faculty includes university scholars teaching alongside seasoned practitioners, and they offer extensive clinical placements for participants, who must demonstrate competence as instructional leaders.

Secretary Cardona – who was himself an adjunct professor in Connecticut's APP program – can help expand such programs nationally, for example by creating seed grants that encourage school-university partnerships and making graduate student loans forgivable to help qualified teachers pursue leadership positions. ●

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EDGEWOOD TEACHER AIDS IN DEVELOPING APP TO ASSESS SCHOOL READINESS AND DYSLEXIA RISK

By Angela Curio

"If there ever was a year to say no, this was the year," said Kim VanBrooklin, a kindergarten teacher at Edgewood Campus School in Madison who spent part of the fall semester of 2020 piloting the new APPRISE app with her students.

But neither VanBrocklin nor Principal Anne Palzkill let the pandemic get in the way of the way of helping researchers to develop a new tool to identify children at risk for developing dyslexia and other reading disabilities before they start struggling in school.

“I think someday, in the next five or 10 years maybe, [APPRISE] will be a household name,” said VanBrocklin, comparing the reading screener app to tools schools use to screen for vision and hearing problems. “So, this is like a history in the making opportunity for the school.”

ABOUT THE PROJECT

APPRISE stands for “Application for Readiness in Schools and Learning Evaluation” and is a “gamified” reading screener app currently in the final stages of development.

The APPRISE project is being led by Professors Fumiko Hoeft and Devin Hearn at the University of Connecticut (UConn) and John Gabrieli at MIT.

Hoeft is an internationally known researcher on the neuroscience of dyslexia and is the director of the Brain Imaging Research Center at the university. Hearn is also an acclaimed researcher on early literacy and dyslexia.

Together, the three researchers have been aiming to develop, validate, and distribute the APPRISE app, a tool that will serve as a free universal reading screener intended for children ages four to eight.

“The APPRISE app helps teachers, pediatricians, and parents assess dyslexia risk, school readiness, and other learning disabilities that will allow for early intervention,” Hoeft said in a statement.

“Children engage in research-based, child-friendly games through individual or small group administration. The app evaluates skills such as response time, working memory, processing speed, and nonverbal IQ.”

While the screener won’t replace a diagnostic assessment, the hope is that the tool will lead to early interventions.

JOINING THE PROJECT

“I became involved when I went to a workshop in Boston where they were looking for teachers to pilot

the app,” said VanBrocklin, referring to the workshop she attended before the pandemic.

After getting permission from her principal, she signed up her class to pilot the program.

Around late October, each student in the class received a Kindle Fire from UConn along with special wipes and plastic bags.

These individual Kindles ensured that students were only touching their own device, minimizing the exposure to each other’s germs.

“We had 100 percent participation,” said VanBrocklin. “They want to get an authentic view of how children are performing with literacy.”

The actual screening took around 10 to 15 minutes.

“We got four to six kids done a day,” VanBrocklin said. “But they had to go through rounds of testing for validity, so it took a couple of months.”

After the pilot testing was done, the Kindles were mailed back to UConn.

“One thing that I think is so great about this project — and it’s really a Catholicity piece — this app is meant to be available to all schools free of charge,” said Palzkill.

“I was so blown away when I met with Kim and the researchers. They actually have IT people working on converting it so that it can be used worldwide.”

PRAISE FOR THE PROGRAM

VanBrocklin offered her own praise for the program, agreeing that the free component of the app appealed to her.

“There are a lot of underserved children in different communities around the United States,” she said. “This would offer everybody the same playing field.”

With the success of the pilot program in the kindergarten classroom, other classrooms at Edgewood Campus School will be joining the pilot program as well.

“The other teachers saw what [VanBrocklin] was doing, so now because of her good work, our 4K teachers and first-grade teachers are all part of the research study,” said Palzkill.

“They are going to start with the research study after spring break. It is going to be a lot of wonderful data that we can get back to tailor instruction. That’s exciting.”

Palzkill also shared her appreciation for “Kim’s energy around this — Not only that she could partner with our families, but to get our staff on board and to have our other teachers join her is really exciting. It really has made a great difference in our primary teams. Her energy and enthusiasm about it has been fantastic.”

There is no word yet as to when the pilot program will be complete for the app to be officially released.

The pandemic has caused some delays, but the researchers are still accepting more school partnerships for the fall of 2021 to pilot the app. ●

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STATE CONSIDERS NOT USING STUDENT TEST RESULTS TO JUDGE TEACHERS’ WORK FOR 3 YEARS

By Cayla Bamberger

Legislators and education department officials are rethinking the way administrators evaluate whether teachers are getting through to students.

A recent bill introduced into the legislature would prohibit districts from using student tests and other performance measures to judge teacher effectiveness for three years. The moratorium gives students the chance to make up lost classroom time because of the COVID-19 pandemic.

Teachers, who have long questioned if student performance reflects teacher effectiveness, welcomed the proposed legislation, while the state education department called for more measured changes to provide districts and families a way of seeing if kids are learning.

“There has to be some happy medium there between finding assessments that will provide reliable information for parents, students and teachers,” said Morgaen Donaldson, an associate professor at the University of Connecticut who researches educator evaluations, “and then having teachers set goals based on those assessments that are smart, realistic and context-specific, and can be part of their evaluation.”

In a typical school year, teachers are evaluated on their students’ performance on standardized tests, among other measures. Almost half of a teacher’s rating — 45 percent — is based on student learning, while the remainder is gleaned from observation, parent or peer feedback and student feedback or school-wide student performance.

But when schools shuttered last spring, the state waived teacher evaluations for the year.

As the pandemic continued to have an impact on students this year, and affected performance data as a result, the state adjusted its evaluation process once again. Current guidance assesses teachers on student social and emotional learning and engagement, rather than academic growth.

Former commissioner Miguel Cardona, now the U.S. Secretary of Education, wrote that the changes “reflect the critical importance of the social and emotional learning and well-being of students and educators during the upcoming academic year while maintaining meaningful feedback and substantive evaluation.”

Now, a bill before the state legislature’s Education Committee would continue to adjust evaluations following the pandemic as students catch up over three school years.

In written testimony, teachers’ unions expressed support for the proposal.

“Student performance in this situation reflects many more factors than the teacher’s performance,” wrote Jan Hochadel of the American Federation of Teachers Connecticut.

The idea of prohibiting student performance data in teacher evaluations is not new. Many teachers take issue with the practice, saying it doesn’t account for outside factors that influence student performance and encourages educators to teach to standardized tests.

Kate Field of the Connecticut Education Association called for suspending academic growth indicators in evaluations until the state reworks them to promote learning and innovation.

“Of course, we should be judging teachers on how much students are growing, but how do we measure that?” Field told Hearst Connecticut Media. “The measurement is what’s going to drive the instruction once you tie it to a teacher’s livelihood and well-being.”

Donaldson, the UConn researcher, said using academic growth as a measure of educator effectiveness suggests teachers have a greater impact on student performance than they actually do.

“Even before the pandemic, that assumption was not supported by research,” said Donaldson, who was the principal investigator of the state’s System for Educator Evaluation and Development pilot program almost a decade ago. “Families, home life, neighborhood contribute a lot to student performance. Teachers do affect it, but their work is not the most major influence.”

The current global crisis has only exacerbated that disconnect, she said.

“There are even more variables that have been introduced, like student mental health” especially for students still learning from home, Donaldson said, where “the availability of food, technology, internet stability, space to work that’s quiet — is not a given.”

Meanwhile, the education department proposed that, rather than eliminate indicators of student academic growth from evaluations, the legislature should extend the current state guidance, a department spokesperson wrote in an email to Hearst Connecticut Media.

The state education department is also in the process of convening a council to overhaul the state’s evaluation process in general. The coalition is using a phased-in implementation schedule beginning in the 2022-23 school year.

Dasha Spell, mom to a sixth grader from Classical Studies Magnet Academy in Bridgeport, said she would be concerned if policymakers rid evaluations of student performance indicators entirely, with some caveats.

“When you have a child not meeting standards, you have to make sure teachers are doing what they’re

supposed to,” said Spell, adding that academic growth alone shouldn’t be the sole measure.

“It’s looking at the whole picture when it comes to evaluating a teacher,” she said. “You have to look at what the teacher is dealing with in the classroom... If we’re not supporting our teachers the way we’re supposed to, we can’t say our teachers failed the kids.” ●

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UNPRECEDENTED FEDERAL FUNDING IS ON THE WAY. HIGH-POVERTY SCHOOLS ARE STARTING TO RECKON WITH HOW TO SPEND IT

By Matt Barnum and Kaylun Belsha

When Superintendent Jaleelah Ahmed and her team found out their Michigan school district would soon receive over \$15,000 in federal aid per student, they were stunned.

“We had so many emotions: Pure joy, gratefulness, to ‘wait a minute, this is too good to be true.’ I was in tears,” said Ahmed, who leads the Hamtramck Public Schools. “The funding means everything for our district. By far, it is beyond what we normally spend every year.”

She’s not alone. Over the last several weeks, officials in many of the country’s least advantaged school districts have realized they are in for something of a windfall from the last two rounds of pandemic relief.

While the average school district will take in less than \$4,000 per student, schools in New York City will get about \$6,500. Los Angeles schools will receive more than \$9,000 per child. Philadelphia’s schools are set to take in over \$13,000. And Detroit, one of the poorest cities in the country, will receive more than \$23,000 per student for its school district.

The numbers vary from state to state, and some low-income schools won't get such massive infusions. But a Chalkbeat analysis in a number of states shows that high-poverty school districts will typically get several times more than their wealthy counterparts.

School officials see political risks ahead. Some worry if the extra funding doesn't lead to immediate academic gains, it could tank proposals to more permanently increase funding for low-income districts. But for now, many have already gotten to work on plans to use the funds to help students who fell behind during the pandemic, plug budget holes, and fix dilapidated buildings.

Ahmed, in Michigan, for example, says the new federal aid will allow her district of 3,300 students to finally afford improvements to its buildings, some of which are so old they're historical landmarks. First on its list: fixing windows that don't open.

Then, Ahmed is hoping to expand after-school and summer programming. That could include more dual enrollment college classes and new ways to engage students with sports, arts, or technology as they work on their English skills. More than two-thirds of her students are English learners, many of whom fled war in Yemen and have acute academic, social, and emotional needs.

"For us to provide this type of programming would give them a huge step in the right direction," she said.

NEW MONEY TURBOCHARGES LONGSTANDING BUT MODEST TITLE I PROGRAM

The figures for the highest-poverty districts are remarkable not only because of their size, but because of which districts are coming out ahead in the context of an American school funding system that has often proven deeply inequitable.

The reason high-poverty schools are winning out is because of the way the legislation requires the funds to be distributed.

Most of the money for schools is passing through Title I, a piece of federal education law passed in 1965 as part of President Lyndon Johnson's "Great Society" push to reduce poverty.

It sends extra money for schools serving children from low-income families, a key aspect of Johnson's strategy. But the program quickly fell out of favor, as some questioned whether the money reached poor students and others grew skeptical that more money would actually help schools improve.

Title I has persisted, but it's remained a small program. The most recent federal budget allocated \$16.5 billion to the program — a tiny fraction of the several hundreds of billions spent on education annually.

But COVID relief has supercharged Title I funding. The lion's share of money for schools from all three packages — the \$13 billion last March, the \$54 billion last December, and the \$123 billion this month — has been sent out through the Title I formula. Temporarily, districts are getting 10 times the funding they normally would through the Title I formula.

Unlike with typical Title I dollars, districts have a great deal of freedom to decide how to use this relief money.

Superintendent Carol Birks, who heads the Chester Upland School District in Pennsylvania — set to receive more than \$11,000 per student from the last two stimulus packages — hopes to spend the money on air conditioning in schools that lack it, upgrading the district's IT infrastructure so more students can use laptops in their classrooms, and adding tutoring for younger students.

The district is already working with some 25 community groups to expand the district's summer programming. And Birks plans to hire more therapists and behavioral support staff to help address growing emotional needs.

But Birks is also hoping to make the case that the financially distressed school district can spend a large infusion of funding wisely. The district has been under state receivership since 2012, and Birks wants to take a cautious, multi-year approach.

"Our goal is not to spend all the money in one year," Birks said. She plans to host town halls and focus groups with families and teachers to hear how they'd like to see the money spent.

"We're going to be developing a planning process of what we can take on year one, year two, so that we do things thoughtfully, purposely, and well," she said. "Because I'm sure we won't get this opportunity again."

WHY NOT EVERYONE WILL HAVE HUGE NEW AMOUNTS TO SPEND

Though high-poverty districts everywhere will get more federal relief money than affluent districts, the numbers vary widely. That's in part because of the quirks of the Title I formula, which tends to reward smaller and poorer states, as well as those that spend a lot of their own money on education.

Louisiana, New York, and Wyoming, for instance, are getting much more per student than the average state.

Colorado, meanwhile, is a relatively affluent state with low levels of school spending. That means fewer big winners. The state's larger high-poverty school districts will get around \$4,000 per student from the recent federal packages, according to a Chalkbeat analysis — more than other Colorado districts, but far less than poor districts in other parts of the country.

Meanwhile, some districts within the same state with seemingly similar shares of low-income students will also get very different amounts. That reflects other aspects of the Title I formula, which tends to give more to districts that have shrunk in recent years. It also relies on the federal poverty calculations, not the share of students who qualify for free or reduced-price lunches, a figure commonly used by states.

There are other curveballs, too, that will affect how much schools will have to spend.

In San Antonio, for instance, schools superintendent Pedro Martinez's biggest concern is that the state will cut his budget in a way that effectively negates the over \$5,000 per student in new federal funds the district is due. Texas districts saw that happen a year ago with the first round of pandemic aid.

For now, Martinez is already busy planning an ambitious four-year recovery plan that will allow schools to extend the school year by up to 30 days.

"We're asking schools, you design a plan working with your parents and teachers of how you'd like to use that extra time," said Martinez. "This is a three-year plan. This is not one summer, do it all."

NEW MONEY COMES WITH SIGNIFICANT POSSIBILITIES, POLITICAL RISKS

While the new funding offers high-poverty districts an opportunity to fill critical gaps, it also means that their spending is likely to face particular scrutiny in the years ahead, which could lead to skepticism about further investments in schools.

Some policymakers say they're watching to see if the money produces immediate results. "If students are still performing at the same level after we spend all this money, then money's not the issue," Mark White, a Tennessee lawmaker, said recently. "It's leadership."

That mentality worries Preston Green, a University of Connecticut education professor.

"The problem that we may have is that, even if we spend the money wisely and do things that need to be done, you may not get the turnaround in two or three years," said Green. "What I'm calling for is more patience."

Research suggests that money does matter for schools — a number of recent studies have shown that more resources tend to lead to better results for students. But it can take time to clearly demonstrate results, and some of the benefits may come in ways that can't be measured on a test.

Pinning down the effects of more money may be especially tough in the wake of the pandemic. Since students have fallen behind, it's possible that extra money may only bring them up to where they would have been academically if not for the pandemic.

But for some advocates of providing extra funding to poor districts, now is the time to prove they can put the money to good use. President Biden has previously promised to triple Title I funding every year.

"Take the money, use it well, and show us the good job you did so we will be empowered to make the argument that money made a difference," said Rep. Bobby Scott, who championed sending money to schools through Title I as chair of the House education committee.

Birks in Chester is eager to prove the value of that investment. She sees this funding as a step toward closing equity gaps that have long existed between

her students and those who live just a six-minute drive away.

“There is such great contrast to what students have,” she said. “We have the opportunity now to reimagine the district in a way that we would never have otherwise if we did not have these financial resources.” ●

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BRINGING ‘BEHAVIORAL VACCINES’ TO SCHOOL: 5 WAYS EDUCATORS CAN SUPPORT STUDENT WELL-BEING

By **Sandra M. Chafouleas**

As many schools in the U.S. figure out how to safely and fully resume in-person instruction, much of the focus is on vaccinations.

But there’s another type of “vaccine” that may be beneficial for some returning K-12 students that could be overlooked. Those are known as “behavioral vaccines.”

Behavioral vaccines are not some sort of serum to help control how children behave. There are no needles, shots or drugs involved. Behavioral vaccines are simple steps that educators and parents can take to help support child well-being throughout the day.

Those actions can be as easy as offering students a warm welcome when they enter the classroom. Studies have shown positive greetings can reduce disruptive behavior and increase academically engaged behavior. Written notes of praise from teachers or other students – such as a thank-you note for helping someone with a math problem – are another example of a behavioral vaccine. These sorts of notes have been found to reduce problem behavior during recess.

ANALYSIS OF THE WORLD, FROM EXPERTS

Behavioral vaccines can also entail activities like breathing exercises to help students feel calm or aerobic play to reduce stress. Each simple action can be used alone or in combination to deliver supports that promote well-being.

CHALLENGING TIMES

As a concept, “behavioral vaccines” have been around for centuries. Intended to prevent disease and promote public health, a behavioral vaccine is a simple action that can lead to big results. Think about hand-washing or seat belt-wearing – behaviors to promote physical well-being and prevent larger problems for individuals and within communities.

As a school psychologist who focuses on matters of student mental health, I believe behavioral vaccines can help improve the social, emotional and behavioral well-being of students. I also think these vaccines are especially important as schools seek to fully resume in-person instruction.

Over the course of the pandemic, there have been reports of increased teen stress, negative states of mind and even more suicide attempts as students struggle with isolation, disruption of their routines and remote-learning fatigue.

Since schools can play a critical role in child development, they represent an ideal venue for public health interventions. With those things in mind, here are five ways that schools can offer behavioral vaccines to returning students:

1. Build strong connections with every child

Positive relationships are key drivers of healthy development. Strong social connection buffers against other risks present in young people’s lives, such as belonging to a group that is seen as a minority, living in poverty or having family members who fall ill. When school provides supportive social connection, it can help reduce vulnerabilities.

Teacher support and connection has been shown to help students feel better about being in school. Behavioral vaccines focused on supportive connection can involve offering an enthusiastic hello when meeting,

building confidence about assignments by giving wise feedback and encouraging students to ask questions. It can also involve taking interest in life outside of the classroom, and adding a daily routine of sharing appreciation for others.

2. Foster positive emotions

Positive emotions such as joy, pride and interest affect learning. Experiencing positive emotions helps children be more aware, focused and ready to solve problems.

A fancy curriculum or a lot of time is not needed – adults can embed simple, easy-to-do strategies throughout the school day. These strategies can include helping students visualize their best possible selves or practice calming breaths.

Figure out which techniques help children be their best. Some students may need to be physically active to boost positive emotions, whereas others may benefit from just being quiet and sitting still.

3. Include adults

Behavioral vaccines can apply across the entire school system – including for every teacher and adult in the setting. Just as with students, teachers can benefit from opportunities to choose and incorporate strategies for reducing stress and bolstering well-being. Peer-to-peer written praise notes, for example, have been found to work for teachers as well as students to increase positive feelings and connection.

Student well-being is connected to teacher well-being. Since the classroom is the primary place for nurturing child well-being in school, prioritizing each teacher's well-being is critical.

4. Be mindful of disciplinary practices

As students return to fully in-person classes, they may bring social, emotional and behavior challenges. Recent estimates suggest over 37,000 students have already lost at least one parent to COVID-19. Students also have missed time to learn and practice classroom skills, such as how to take turns, understand others' perspectives or even work quietly. Being empathetic toward student experiences will be critical to reducing reliance on suspensions and expulsions.

School teams must carefully monitor their use of exclusionary discipline to make sure it does not disproportionately affect certain subgroups, such as Black students, boys or students with disabilities.

5. Recognize different student needs

In typical circumstances, children develop at different rates, times and ways. Every student will enter school with a different set of risks, some that were previously present and some magnified.

As British writer Damian Barr stated: "We are not all in the same boat. We are all in the same storm. Some are on super-yachts. Some have just the one oar." Each child's boat is different. Some will need more than others to keep moving in the right direction and stay afloat.

Schools need to be prepared to deliver different types and "doses" of behavioral vaccines. Having a variety of behavioral vaccines at the ready can help schools more quickly bring about well-being for all students. ●

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REOPENING SCHOOLS REQUIRES DOING LESS, BETTER

By George Sagai and Sandra M. Chafouleas

For educators, families, and communities, April is bringing a welcome sign of hope to a year of uncharted challenges as political unrest, COVID-19, social and racial disparities, and violence have disrupted and dismantled our schools' traditional approach to education. The appointment of Miguel A. Cardona as the 12th Secretary of Education and the passing of the American Rescue Plan of 2021 does make it feel like spring, in fact, has sprung. The possibility of equitable school environments for our nation's children appears tangible, however, recovery must attend to more than filling holes with intent to return to a "new normal."

Students desperately need support as they try to overcome current challenges to academic learning, physical health, and social-emotional connection. Meanwhile, school leaders must focus on coordinating policies and practices that put equitable structures in place for every child. While the necessary federal leadership and funding provide necessary first steps to tackling multiple points of support to the education infrastructure, we propose that schools reopen not with a “new normal,” but a “better normal” — one where we carry out only a few highly effective actions really well. A “better normal” approach requires us to be scientifically informed as well as contextually and culturally responsive — all of which must be led by individuals who can decisively and expertly do less, better.

Simply telling educators to “do less” is not a solution. We need school and district leaders to make wise decisions as they address the unprecedented increase in student needs across many areas. They need explicit support in establishing this “better normal” — for instance, in the form of guidance distilled into distinct, concrete actions, known as “effective kernels.” Effective kernels refer to fundamental practices, implemented alone or in combination, that produce desired change quickly. Effective kernels are also usable, meaning that the user — in this case, a school leader — can put them into practice with ease and satisfaction. In healthcare, for example, research shows that using checklists increases surgical safety and improves patient outcomes.

As education leaders navigate our emerging new reality, it is critical that their decisions, and guidance that informs their decisions, be effective and usable. The evolving education environment demands nimble decision-making that relies on the best available knowledge.

To inform school and district leader decisions to “do less, better,” we offer the following guiding actions:

—Education leaders must do what has high probability of working. We have limited time to pilot or investigate novel, untested practices. Let’s rely on the robust research base that already exists on effective practices for everything from schoolwide systems of support and problem-solving and effective instruction to social-emotional-behavioral interventions and positive classroom and school climate.

—Education leaders must catch issues early. We cannot wait for problems to surface or worsen, issues to resolve themselves, or react when they occur. More students will be coming to school behind in their achievement and with personal, family, and community trauma. Let’s be prepared for what we know students will bring to the classroom.

—Education leaders must teach positively. Although punishment might signal to students that they have made an error or misbehaved, harsh physical, emotional, or verbal consequences do not result in learning, especially for students at high risk for academic and/or social behavior failure. Teachers and school leaders who provide students with frequent opportunities to see, practice, and experience positive successes are doing less, better.

—Finally, education leaders must make decisions that consider diversity, equity, and inclusivity. Education has not successfully addressed disparities and inequities associated with racism, sexism, or ableism. Now more than ever, school leaders must ensure that every student and their family members and educators have equitable access and opportunity. Let’s remember to consider longtime marginalized groups.

Our children, families, and educators deserve and demand a reopening response that is smart, efficient, and deliberate. Given the current risks and challenges, we do not have the luxury of simply restoring previous routines, taking time to implement, or adding to what was done in the past.

School and district leaders must be supported to do a few tried and true things really well. Let’s do less, better. ●

BRINGING JOY BACK TO THE CLASSROOM AND SUPPORTING STRESSED KIDS – WHAT SUMMER SCHOOL LOOKS LIKE IN 2021

By Raphael Travis Jr, Kathleen Lynch, Kathy Hirsh-Pasek, Naomi Polinsky, and Roberta Golinkoff

Already 62% of parents believe their children are behind in learning, according to a survey conducted by the National PTA and Learning Heroes. The transition from in-person to remote learning in 2020 has disrupted students' academic work. We've assembled a panel of academics to talk about how summer schools should be supporting students this year. Here, five experts explain what summer school does, and why it may look very different this year.

'Does voluntary summer school work?'

Kathleen Lynch, assistant professor of learning sciences, University of Connecticut

Summer school programs help children get better at both reading and mathematics. Students who attend summer school tend to have higher test scores than those who don't, which means that offering voluntary summer programs is likely to help students catch up from pandemic-related learning slowdowns. And summer learning programs may also improve outcomes beyond test scores, such as by helping students to recover course credits.

Summer learning programs work best when the reading instruction uses research-based strategies such as guided oral reading and modeling approaches to reading comprehension, and when daily time is given to math.

Sports, extracurricular clubs and field trips can improve attendance at summer school programs – a necessary ingredient for learning.

Summer programs can and should also create hands-on learning activities to build personal and social skills that will help children during the school year. For example, one summer program, in which students in Baltimore worked in teams to build robots while also learning math, improved school attendance during the following academic year.

'What should summer school look like after a year of the pandemic?'

Roberta Golinkoff, professor of education, University of Delaware; Kathy Hirsh-Pasek, professor of psychology, Temple University and the Brookings Institution; Naomi Polinsky, doctoral candidate in cognitive psychology, Northwestern University

Summer school is the perfect time to return joy to classrooms with educational games, physical activity and inviting children to talk and participate. This year in particular, it's a chance to reimagine what the regular school year will look like, and make sure it meets kids' academic and social needs after many months of the pandemic.

Blending the fun of summer camp with summer school allows us to put the best science to work for children – and teachers. Playful learning that is active, engaging, meaningful, socially interactive and fun can reignite a love of learning along with promoting strong teacher-student relationships.

The Department of Education is aligned with this vision of what summer school can be for children – an active and interactive experience that enriches 21st-century skills like collaboration, communication, content, critical thinking, creative innovation and confidence, or the "6Cs." When children work together to figure out which butterflies are local, they are engaging in collaboration, communication and content. When they investigate whether a moth is the same as a butterfly, they are using critical thinking. And when they present their findings to the class, they are using creative innovation and building their confidence.

Summer school can have a rich curriculum and still cultivate the skills that children will need to succeed in a world where knowing how to solve problems, beyond just knowing the answer, is of critical importance. Indeed, children learn best when they are actively engaged with the material.

When material to be learned is meaningful and linked to children's lives, it is also easier to learn. And children love to be socially interactive and learn with their peers. Learning should be iterative so it can be revisited and tied in with new learning. These learning principles increase children's learning by increasing their agency and making the learning "stick."

'What challenges will summer school teachers face this year?'

Raphael Travis Jr., professor of social work, Texas State University

Teachers may not be prepared to address the social and emotional needs of children, needs that have always existed but will play an important role this summer if children are to attend summer school.

In summer programming meant to support the social and emotional needs of youth, the phenomenon of "summer strain" was introduced to highlight the student stress and mental health concerns that continue to affect student lives throughout the summer, without the added buffer of school structure and support. This contrasts with the idea of summer slide or summer slump, which focuses on perceived academic losses during summer months.

One strategy using hip-hop culture allows youths to shape the direction of activities by exploring, researching and processing emotional themes of importance to them, such as strained relationships or overcoming life challenges. Next, they are able to make music that discusses these themes and possible solutions, for themselves or for others.

Of course, the circumstances that produce summer strain have occurred on an even larger scale during the COVID-19 pandemic. This includes reduced activity, loneliness and social isolation, family stress, and limited access to food and mental health services.

Health care claims for teenagers increased substantially between April 2019 and April 2020, reflecting significant increases in anxiety, depression and substance use disorders. Girls, LGBTQ+ youth and children from minority racial or ethnic groups have been particularly affected.

I believe we must take meaningful steps to refocus summer school programs beyond academics to address these challenges. ●

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STUDENTS ARE RETURNING TO SCHOOL WITH ANXIETY, GRIEF AND GAPS IN SOCIAL SKILLS – WILL THERE BE ENOUGH SCHOOL MENTAL HEALTH RESOURCES?

By Sandra M. Chafouleas and Amy Briesch

Even before COVID-19, as many as 1 in 6 young children had a diagnosed mental, behavioral or developmental disorder. New findings suggest a doubling of rates of disorders such as anxiety and depression among children and adolescents during the pandemic. One reason is that children's well-being is tightly connected to family and community conditions such as stress and financial worries.

Particularly for children living in poverty, there are practical obstacles, like transportation and scheduling, to accessing mental health services. That's one reason school mental health professionals – who include psychologists, counselors and social workers – are so essential.

As many kids resume instruction this fall, schools can serve as critical access points for mental health services. But the intensity of challenges students face coupled with school mental health workforce shortages is a serious concern.

KEY ISSUES

As school psychology professors who train future school psychologists, we are used to requests by K-12 schools for potential applicants to fill their open positions. Never before have we received this volume of contacts

regarding unfilled positions this close to the start of the school year.

As researchers on school mental health, we believe this shortage is a serious problem given the increase in mental health challenges, such as anxiety, gaps in social skills and grief, that schools can expect to see in returning students.

Anxiety should be expected given current COVID-related uncertainties. However, problems arise when those fears or worries prevent children from being able to complete the expected tasks of everyday life.

Meanwhile, school closures and disruptions have led to lost opportunities for students to build social skills. A McKinsey & Co. analysis found the pandemic set K-12 students back by four to five months, on average, in math and reading during the 2020-2021 school year. Learning loss also extends to social skills. These losses may be particularly profound for the youngest students, who may have missed developmental opportunities such as learning to get along with others.

And it's important to remember the sheer number of children under 18 who have lost a loved one during the pandemic. A study published in July 2021 estimates that more than 1 out of every 1,000 children in the U.S. lost a primary caregiver due to COVID-19.

HIRING MORE SCHOOL PSYCHOLOGISTS

Hiring more school psychologists may not be simple. The National Association of School Psychologists recommends a ratio of 1 psychologist for every 500 students. Yet current estimates suggest a national ratio of 1-to-1,211. It's like having to teach a class of 60 instead of 25 students.

Shortages are particularly severe in rural regions. There are also not enough culturally and linguistically diverse school psychologists. Scarcity of school mental health personnel affects important student outcomes from disciplinary incidents to on-time graduation rates – especially for students attending schools in high-poverty communities.

To address these shortages, legislators have proposed federal bills that aim to expand the school mental health workforce. Meanwhile, local school districts and state education agencies are using American Rescue Plan funds to increase mental health training, hire

additional mental health staff or contract with community mental health agencies.

PREPARING ALL SCHOOL PERSONNEL

We believe increasing the number of mental health providers in schools is important. Workforce increases, however, must be coupled with attention to readying all school personnel to cope with students' anxiety, grief and gaps in social skills.

For example, when it comes to anxiety, schools can help students build both tolerance of uncertainty and coping skills through strategies such as seeking support, positive reframing, humor and acceptance. School mental health professionals can train other staff members on simple strategies to use in a nurturing relationship. Long-term benefits such as sense of belonging can happen when each student has an informal mentoring relationship that offers emotional nurturance and practical help.

More schools have adopted social-emotional learning curriculums in recent years. However, additional time may be needed to teach and reinforce basic skills such as taking turns and sharing. In addition, school mental health personnel can assist with defining a clear process for identifying who needs help, and be ready to share resources about grief and how kids respond to loss.

PARTNERING WITH FAMILIES AND COMMUNITIES

Even with these efforts, schools cannot be expected to identify and meet all young people's mental health needs. Strong partnerships with families and communities are critical.

Seeking input from families may offer valuable information about student experiences. This might be done, for example, by adding questions to beginning-of-the-year student forms. Knowing how families are experiencing loss or insecurities, for example, can help school mental health personnel plan for and target supports.

The youth mental health crisis requires a comprehensive response. We believe the priority should be ensuring equitable access to a mental health professional through school settings. ●

INCOMING UCONN CLASS THE SCHOOL'S MOST RACIALLY DIVERSE YET, AND THE FIRST SINCE SAT/ACT MADE OPTIONAL

By Amanda Blanco

About 5,500 UConn freshmen out of a record-breaking 38,000-plus applicants for the Class of 2025 began classes Monday. They represent the most racially diverse class in the school's history, and the first to join the school through an optional SAT/ACT test admissions policy.

About 3,700 first-year students will attend classes at the Storrs campus, while about 1,800 are enrolled at UConn's regional campuses. According to the schools' most recent estimates, about 23,300 total undergraduates are enrolled for the 2021-2022 school year. The university may update figures again on the 10th day of the semester.

CLASS SIZE

The Class of 2025 includes an estimated 5,500 first-year students total, about 250 students less than the Class of 2024. The Storrs campus enrolled about 3,900 freshmen in 2020, compared to about 3,700 in 2021. The total number of students transferring to UConn for the 2021-2022 school year also decreased from about 1,000 to about 860.

Because of the uncertainty surrounding COVID-19 last year and concerns about lower enrollment rates among applicants due to limited in-person learning, UConn decided to admit a higher number of students than the school usually would, said UConn Director of Undergraduate Admissions Vern Granger.

"We wanted to make sure that we mitigated that potential risk, so we admitted a few more students [in 2020]," Granger explained. However, declines in

enrollment were "less than we anticipated," he said, resulting in a larger class size that year.

The Class of 2025's size is similar to that of the Class of 2023, which was admitted in 2019 — before the coronavirus hit Connecticut. About 1,800 first-year students are attending the regional campuses in Hartford, Stamford, Waterbury and Avery Point, an amount similar to the Classes of 2024 and 2023.

After the university announced its required COVID-19 vaccination policy with medical and nonmedical exemptions over the summer, Granger said four students contacted the admissions office to tell UConn they would no longer attend the school.

"They emailed us to say they were unhappy, that they were going to withdraw, [so] they are no longer in our enrolled count," he added.

FIRST TEST-OPTIONAL ADMISSIONS CYCLE IN UCONN HISTORY

During the spring of 2020, UConn announced plans for a test-optional admission cycle for the Class of 2025, as well as the following two classes. Under this policy, students could choose to submit their ACT or SAT scores, but "would not be penalized or disadvantaged if they chose not to," said the university.

"We know our current UConn students were impacted by COVID, but the application review process also showed us very clearly how it affected high school students and added stress to their college planning," Granger said in a statement. "We've been in contact with our campus partners to be sure our faculty and staff know they've had a different experience compared with the past, and are prepared to work with those students in whatever way they need in the transition."

Because of the new policy, UConn chose not to release test scores for the incoming class, but it did say the class includes 73 valedictorians and 88 salutatorians, and 554 first-year students were accepted into the school's honors program. In the previous class year, the middle 50% of enrolled freshmen had a combined SAT range of 1235-1390 and a combined ACT range of 26-31.

MOST DIVERSE UCONN CLASS YET

About 46% of Storrs freshmen are students of color, an increase of about 4% from the Classes of 2024 and

2023. Close to 20% of first-year students on the campus are Hispanic/Latinx, about 14% are Asian, 8% are Black and 4.5% are multiracial. Less than 1% of the students identify as American Indian/Alaskan Native or Hawaiian/Pacific Islander.

Across all campuses, freshman students represent 157 of Connecticut's 169 towns, said UConn spokesperson Stephanie Reitz, and about 77% of all UConn undergraduates are Connecticut residents.

At Storrs, 3,585 of the 3,700 freshmen attending classes there will live on-campus. The remaining 115 students are exempt from the first-year residency requirement for various reasons, most commonly because they already live very close to campus with their families or they are over the age of 21, she explained.

FEWER INTERNATIONAL STUDENTS, BUT MORE OUT-OF-STATE STUDENTS

About 60% of the Storrs incoming class is from Connecticut, with the remaining 40% of students representing 42 states and 17 countries — a flip from what the university saw in 2019, when UConn's freshman class across campuses represented 35 countries and 28 other states.

International students typically make up about 10% of UConn's entire first-year population. But due to pandemic-related travel issues, that number dropped to about 6% for the 2021-2022 school year. However, the number of out-of-state freshmen attending UConn increased from 30% to 34%.

In order to meet some international students' needs, Granger said the university is continuing partnerships with the East China Normal University in Shanghai and the University of Nottingham's campus in Ningbo, located a few hours to the south. Last year, the UConn Board of Trustees approved a program that would allow students to take full course loads remotely at those schools. ●

CHARTER SCHOOLS' SCARY FUTURE

As Democrats withdraw support, we may see a future in which charters turn rightward—while still getting federal funding.

By Jennifer C. Berkshire

In 2019, when West Virginia passed legislation that allowed for the creation of charter schools, it represented yet another feather in the cap of the school-choice movement. Nearly three decades after the creation of the very first publicly funded, privately managed school, in Minnesota, charters now educate more than 3.3 million K-12 students in 7,500 schools across the country, and West Virginia—where lawmakers ignored the fierce opposition of the state's teachers' union—became the forty-fifth state to allow them.

Yet today the charter school movement itself is perhaps more vulnerable than it has ever been. Unlikely allies in the best of times, its coalition of supporters—which has included progressives, free-market Republicans, and civil rights advocates, and which has been handsomely funded by deep-pocketed donors and Silicon Valley moguls—is unraveling.

Much of the blame rests on the hyperpolarized politics of the Trump era. Under Betsy DeVos, the lightning-rod secretary of education, Republicans rediscovered their love for private school vouchers and religious education. And with the taste for all things neoliberal on the wane within today's Democratic Party, charter schools, long the favored policy plaything of the liberal donor class, are simply a harder sell.

David Menefee-Libey, a professor of politics at Pomona College, likened the original political coalition that came together to back charter schools to a treaty. "You see this bipartisan embrace of a market-based approach to schooling, but both sides also had to give something up," he said. For Democrats, that meant weakening the party's support for teachers' unions—a key constituency—and retreating on demands for school integration. Republicans, meanwhile, accepted charter

schools as a watered-down alternative to private school vouchers.

Today, said Menefee-Libey, that treaty is in tatters, and the GOP's original passion project is ascendent once more. "Trump-era Republicans like Betsy DeVos are more interested in weakening public education (and public-sector) institutions and principles than they are in holding this pro-charter school coalition together," he noted.

And West Virginia's most recent legislative session provided a demonstration of this shifting dynamic in action. Fresh off that 2019 approval of charters—and in what teachers' organizations maintained was retaliation for an earlier (and largely successful) 2018 teachers' strike—state lawmakers first passed an anti-strike bill for public employees. They then rushed to enact sweeping school-choice legislation to encourage faster expansion of charter schools, including online charters, neither of which have even begun operating in the state.

But the GOP's most stunning move was to enact, without a single Democratic vote, the Hope Scholarship Program, a sweeping voucher program aimed at moving students out of what the right refers to derisively as "government schools." Starting in 2022, West Virginia parents who withdraw their children from public schools will receive their child's state share of public education funding—approximately \$4,600 in 2021—to spend on virtually any educational cost: private school tuition, online education programs, homeschooling, tutors, even out-of-state boarding schools. Newly school-age students whose parents never intended to go the public route are also eligible for the funds, which can be banked and spent on future expenses, similar to a health savings account.

While West Virginia's moves were the most dramatic, legislators in 18 states, including Florida, Indiana, Arizona, and New Hampshire, were close behind, creating private school-choice initiatives or expanding existing ones. Although lawmakers pointed to the pandemic's shuttering of public schools as part of the justification, schools—both public and private—in most of these states remained open. For all of the bluster from Florida Governor Ron DeSantis and others about the importance of in-person schooling, the GOP's favored school-choice programs increasingly bypass traditional classroom learning altogether. Instead,

parents are encouraged to use publicly funded "education freedom accounts" to purchase an array of education "options," much like television viewers who eschew cable packages for à la carte channels.

Charles Siler, a former lobbyist for the pro-privatization Goldwater Institute in Arizona, says that the GOP's increasing hostility to public schools could ultimately harm charters as well. "The real target here is taxpayer-funded public education, and that's a category that includes charters," said Siler.

"What about charter schools?" quipped Supreme Court Justice Stephen Breyer in his dissent in the 2020 case known as *Espinoza v. Montana Department of Revenue*. In a ruling cheered by school voucher supporters, the court held that states subsidizing private education can't deny funding to schools because they're religious. But as Breyer pointed out, the murky territory between public and private occupied by charter schools likely means that the court's ruling also applied to them, invalidating strict state and federal prohibitions against religious charters.

DeVos pounced, announcing that the Department of Education would begin accepting applications from religious organizations seeking federal money to open charter schools. The Biden Department of Education hasn't indicated whether it plans to once again ban religiously affiliated charters from participating in the program. Such a prohibition would almost certainly be challenged in court as discriminatory by advocates who have a growing list of legal rulings on their side.

"It's not a question of if, but when," said Preston Green, an education and law professor at the University of Connecticut, who first began writing about the possibility of religious charter schools back in 2001. "For religious entities, access to public revenue is tremendously appealing, and now you have the courts basically saying to states, 'You can't prevent this.'"

But the specter of publicly funded schools that are explicitly religious could cause the progressive and conservative wings of the charter movement to further splinter. The "public" nature of charters has long been one of their strongest selling points, even as the schools are subject to less scrutiny than their district counterparts, and some 15 percent are operated as for-profit ventures. Now schools that can discriminate—refusing to admit gay students, for instance, or children

of single mothers, on religious grounds—are a distinct possibility.

The ferocious blowback against critical race theory represents yet another threat to charter schools. Many of the bills limiting how teachers can discuss issues of race and racism, including those passed in Tennessee and Texas, also apply to charters. Federal legislation proposed by a Wisconsin lawmaker would ban the teaching of CRT in Washington, D.C., where nearly half of the city's students attend charter schools. And one of the first high-profile anti-CRT lawsuits filed in federal court involves Democracy Prep, a high-profile charter network with 22 schools across the country. A student at a Democracy Prep charter in Las Vegas claims that he was threatened with a failing grade in a required course unless he “confessed” his “privilege.” (The case is ongoing.)

While legislators have often been hard-pressed to identify examples of CRT being taught in public elementary and secondary schools, charter schools occupy a more complicated relationship to CRT's framework. Advocates have long made a civil rights case that charters, which typically don't tie enrollment to neighborhood, are a necessary rejoinder to the structural racism perpetuated through the legacy of redlining. Black-centric charters, meanwhile, which infuse Black history and culture throughout the curriculum, are also increasingly popular.

“These schools were meant to meet the needs of the Black community in a way that traditional schools weren't doing. That makes them vulnerable to attack now,” said Green.

Charter schools' new vulnerability on the right dovetails with diminished enthusiasm on the part of moderates and progressives for the charter experiment generally. Take the federal Charter Schools Program, which helps charter school networks expand. During the Obama years, Democrats helped the program grow to its current \$440 million. Now they're seeking to cut its budget by 10 percent and ban the use of federal funds by for-profit charters, while increasing funding for public education generally. And even in blue states, where charters have enjoyed dramatic growth in urban areas, often with support from Democratic mayors, business groups, and philanthropic foundations, communities have begun to push back against further growth, warning that continued expansion threatens to

undermine public school districts by siphoning off both students and the funding that accompanies them.

Carol Burris, the executive director of the Network for Public Education, an advocacy group that publishes research critical of charters, argued that DeVos's fervent embrace of school choice is, ironically, partly to blame for the plateauing of the schools' appeal. “Everything changed when DeVos was in charge,” said Burris. “Progressives and moderates started to see that charter schools were really a ‘gateway drug’ for the libertarian right, a means to further the destruction of public education.”

As the political coalition crumbles on all sides, charter advocates face an uncomfortable dilemma. With Democrats drifting away, they must look for new friends on the right, among some of the same lawmakers who are stoking the culture war now threatening to consume public education. A movement that has long billed itself as the civil rights cause of our time may have no choice but to ally itself with politicians who are only nominally pro-charter but are specifically pro-white supremacy. Thirty years ago, charter advocates successfully assembled the unlikeliest of political coalitions. The next one may be even more improbable. ●

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HOW TO GET INTO A MAGNET SCHOOL

Finding the right fit is important, and that takes research and preparation.

By Tamara Lytle

Many parents looking at high school educational options are likely to encounter a magnet school, whether it is focused on science, the arts, public service or even more specialized interests.

“Magnet schools have been a springboard for success for so many students,” says Todd Mann, executive director of Magnet Schools of America, a professional association that supports magnet schools.

Magnet schools were born of the civil rights movement as a way to eliminate school segregation. They are part of public school districts, or sometimes a collaboration between more than one district, and are run by public school administrators. Unlike traditional public schools, they often have a focus, like arts or science, and draw students from outside the usual neighborhood boundaries.

About 3.5 million children attend magnet schools – roughly one of every 15 students in public schools – and there are about 4,340 magnet schools across the country, according to Magnet Schools of America. California, Florida, New York, Illinois, North Carolina and Texas all are states where magnet programs are strong.

CHOOSING A MAGNET SCHOOL

Magnet schools offer an increasing number of specializations. For example, the Connecticut River Academy in Connecticut is a high school focusing on advanced manufacturing and environmental science. At the Sumner Academy of Arts and Science in Kansas, every student participates in the rigorous International Baccalaureate program.

Education experts say parents need to do research to determine whether a magnet school is a solid fit. “Seek information often and early,” says Casey Cobb, a professor at the Neag School of Education at the University of Connecticut, who researches magnet school policies.

Laurie Kopp Weingarten, a certified educational planner and independent educational consultant in New Jersey, says magnet schools have pros and cons.

“For students who know what they want to study, they can start exploring at a younger age,” she wrote in an email. “That can help them learn if they truly are interested in the field that the magnet school focuses on. They also receive, in many cases, a private school education equivalent at a public school cost.”

The danger, she says, is that students are asked to make a decision in eighth grade, and a four-year commitment can be a lot for someone just entering their teens.

“Often these students realize after a few years that the subject of the magnet school doesn’t align with their interests and talents,” Weingarten says. “At that point, they either have to remain in the high school, studying

classes that don’t interest them, or they need to return to their home high school in the middle of their school years. Neither option is optimal.”

There are also many considerations beyond academics. Magnet schools can involve longer commutes, and not all provide transportation. That can add to a family’s logistical challenges and costs. Some smaller schools have fewer offerings in terms of sports and other activities. A magnet school can also mean friends are spread out geographically, giving children fewer peers in their own neighborhoods.

APPLYING TO A MAGNET SCHOOL

Magnet schools that have too many applicants sometimes use lotteries for admission. Schools in extremely high demand often have grade requirements and use standardized tests. Some go even further. For example, Thomas Jefferson High School for Science and Technology in Virginia, rated one of the top high schools in America, includes a problem-solving essay as part of the application. Schools that focus on performing arts, such as Duke Ellington School of the Arts in Washington, D.C., can require an audition or portfolio review.

“Families should gather as much information as they can about admissions,” Weingarten says. “Most high schools are transparent about how the process works. It can usually be found on their website. ... They can then try to prep their student for the test, essay, interview, etc. And, of course, students need to earn high grades in middle school.”

Parents will want to help their children prepare. For example, if the school requires an interview, parents can set up mock interviews with a family member. Asking other families who have been through an interview process can help kids understand what to expect, Cobb says.

Though the COVID-19 pandemic has caused schools in many locales to question their testing policies, admissions tests are still common. Parents can help students improve their scores by practicing for the test in much the same way that college applicants practice for the SAT or ACT. Books and classes are available to get students ready for most standardized tests.

Weingarten says tests can weigh heavily on admissions in some areas. “In Monmouth County, New Jersey, where I reside, it’s a whopping 70% of the decision,”

she says. “The other 30% is grades in seventh and eighth grade. There are no other criteria.”

UNDERSTANDING ADMISSION LOTTERIES

School districts often use lotteries to decide who gets into magnet schools, but the systems are not always completely random. Students in some locales get extra points in the lottery for a variety of factors. Los Angeles, for example, gives students extra credit in the lottery for having a sibling at the magnet school, having been on the waitlist the previous year and for coming from a school with overcrowding.

Families in districts with many magnet schools can sometimes list several top choices to improve the chances of getting into one. Often, a lottery drawing will fall short of an admission but will result in placement on a waitlist. A high placement on that list can sometimes result in an admission if students who were admitted in the first round choose not to go.

Whether admission is by lottery or other means, education experts say magnet schools offer benefits that can make the application process worth it. Magnet Schools of America reports that 90% of students graduate at magnet high schools and that 72% go to college.

“A magnet school can offer an advantage because the students are bright ... so the classes are demanding and may be more rigorous than normal honors classes,” Weingarten says. “In addition, the school is much smaller than the normal public high school. Students benefit from individualized attention and guidance.” ●

HOW TO NURTURE CREATIVITY IN YOUR KIDS

By James C. Kaufman

Parents who want their kids to be more creative may be tempted to enroll them in arts classes or splurge on STEM-themed toys. Those things certainly can help, but as a professor of educational psychology who has written extensively about creativity, I can draw on more than 70 years of creativity research to make additional suggestions that are more likely to be effective – and won’t break your budget.

1. BE CAUTIOUS WITH REWARDS

Some parents may be tempted to reward their children for being creative, which is traditionally defined as producing something that is both new and useful. However, rewards and praise may actually dissuade your child’s intrinsic interest in being creative. That’s because the activity may become associated with the reward and not the fun the child naturally has doing it.

Of course, I am not saying you should not place your child’s artwork on your fridge. But avoid being too general – “I love every bit of it!” – or too focused on their innate traits – “You are so creative!” Instead, praise specific aspects that you like in your child’s artwork – “I love the way you made such a cute tail on that dog!” or “The way you combined colors here is pretty!”

Some rewards can be helpful. For example, for a child who loves to draw, giving them materials that they might use in their artwork is an example of a reward that will help them stay creative.

It is also important to note that there are many activities – creative or otherwise – for which a child may not have a particular interest. There is no harm – and much potential benefit – in using rewards in these cases. If a child has an assignment for a creative school activity and hates doing it, there may not be any inherent passion to be dampened in the first place.

2. ENCOURAGE CURIOSITY AND NEW EXPERIENCES

Research shows that people who are open to new experiences and ideas are more creative than those who are more closed off. Many parents have children who naturally seek new things, such as food, activities, games or playmates. In these cases, simply continue to offer opportunities and encouragement.

For those whose children may be more reticent, there are options. Although personality is theoretically stable, it is possible to change it in subtle ways. For example, a study – although it was on older adults – found that crossword or sudoku puzzles can help increase openness. Childhood and adolescence is a natural period for openness to grow. Encouraging curiosity and intellectual engagement is one way. Other ways might include encouraging sensible risk-taking – such as trying a new sport for a less athletic child or a new instrument for one less musically inclined – or interest in other cultures. Even very simple variations on an evening routine, whether trying a new craft or board game or helping cook dinner, can help normalize novelty.

3. HELP THEM EVALUATE THEIR BEST IDEAS

What about when children are actually being creative? Most people have heard of brainstorming or other activities where many different ideas are generated. Yet it is equally important to be able to evaluate and select one's best idea.

Your child might think of 30 possible solutions to a problem, but their creativity will not be expressed if they select the one that's least interesting – or least actionable. If giving praise can be tricky, feedback can be even tougher. If you are too harsh, you risk squashing your child's passion for being creative. Yet if you are too soft, your child may not develop their creativity to the fullest extent possible.

If your child seeks out your input – which in adults can be a good indicator of creativity – make sure to give feedback after they have already brainstormed many possible ideas. Ideally, you can ensure your child still feels competent and focus on feedback that connects to their past efforts: "I like the imagery you used in your poem; you are getting better! What other metaphors might you use in this last line?"

4. TEACH THEM WHEN NOT TO BE CREATIVE

Finally, creativity isn't always the best option. Sometimes, straightforward solutions simply work best. If the toilet is clogged and you have a plunger, you don't need to make your own from a coat hanger and bisected rubber duck. More notably, some people, including teachers, say they like creative people but actually have negative views of creative kids without even realizing it.

If your child is in a class where their creativity is causing some blowback, such as discipline issues or lowered grades, you may want to work with your child to help them understand the best course of action. For example, if your child is prone to blurt out their ideas regardless of whether they are related to the discussion at hand, emphasize that they should share thoughts that are directly relevant to the class topic.

If, however, you get the feeling that the teacher simply does not appreciate or like your child's creativity, you may want to suggest that your child keep an "idea parking lot" where they write down their creative thoughts and share them with you – or a different teacher – later in the day. Creativity has a host of academic, professional and personal benefits. With some gentle nudges, you can help your child grow and use their imagination to their heart's content. ●

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HOW REPARATIONS CAN BE PAID THROUGH SCHOOL FINANCE REFORM

By Preston Green III and Bruce Baker

White public schools have always gotten more money than Black public schools. These funding disparities go back to the so-called "separate but equal" era – which was enshrined into the nation's laws by the Supreme Court's 1896 decision in Plessy v. Ferguson.

The disparities have persisted even after *Brown v. Board of Education*, the landmark 1954 Supreme Court decision that ordered the desegregation of America's public schools.

Since Black schools get less funding even though Black homeowners pay higher property taxes than their white counterparts, we think reparations are due – and they can be paid by reforming the ways Black homeowners are taxed and schools in Black communities are funded.

We make this argument as school finance and education law scholars who have studied racial inequality in education for decades. We propose a four-part reparations plan to address racial inequalities in education. The plan deals with: 1) local property taxes, 2) school revenues, 3) targeting funding to close gaps in student outcomes, and 4) federal monitoring.

1. TAX REBATES TO BLACK HOMEOWNERS

A big reason for racial funding disparities is housing segregation. This separation has led to vast differences in housing values and wealth that families have been able to accumulate. This in turn affects how much funding can be raised through property taxes for local public schools.

In Connecticut, for example, Black-owned homes are valued on average at about \$250,000, versus over \$420,000 for white-owned homes. Even for homes in the same metro areas within Connecticut with the same number of bedrooms, the difference is \$173,000.

Since Black home values overall are lower, higher tax rates are often adopted to generate more local tax revenue. This comes in the form of what we refer to as a "Black Tax." In Connecticut, the average Black homeowner pays a Black Tax of just over 0.6% in higher property taxes. On a \$250,000 home, that amounts to \$1,575 per year. But even with higher tax rates, Black communities do not raise the same amount of property tax revenue to fund public schools as white communities in the same state or metropolitan area. Tax rates required to fully close these gaps would simply be too high. In a 2021 article, we documented similar disparities in other states, including Maryland and Virginia.

We recommend direct rebates to Black homeowners in previously redlined or otherwise segregated

communities in the amount calculated to cover the Black Tax. For example, the Black Tax in Bridgeport, Connecticut is just over 0.5%. For a home valued at \$340,000, the annual rebate amount would be just over \$1,800. These rebates would put money in the hands of Black homeowners, who would then have the option to either spend more on their local public schools or increase their personal savings. Either way, we believe they are owed this compensation, including possible cumulative compensation for past overpayment.

2. CLOSING RACIAL GAPS IN SCHOOL DISTRICT REVENUES

State general aid programs, which are intended to make sure all schools get equitable funding, routinely fall short.

In Connecticut, the average state general aid per Black child is \$2,756 more than the average state general aid per white child. This is because districts serving Black children tend to have less of their own taxable wealth. That is, districts serving more Black children do receive more state general aid than districts serving more white children, but not enough to close the gap \$4,295 in local revenue raised. We calculated that the remaining gap is \$1,574 per pupil. Additional state aid to school districts in Black communities could close this gap.

3. CHANGE HOW RACE FACTORS INTO SCHOOL AID FORMULAS

Money matters for improving schools and improving student outcomes – from test scores to graduation rates and college attendance. School finance reforms have proved especially beneficial to Black students. Research is increasingly clear in this regard. Equitable and adequate financing of public school systems is a necessary condition for ensuring children equal opportunity to succeed.

State school finance formulas include weights – or cost adjustments – for things like how many children live in poverty or how many children have disabilities. The idea is that such children require more money to educate. The evidence and related studies show that, because of governmental policies that created racial isolation and the economic disadvantage that accompanies it, school and district racial composition is an important factor to

include in state school finance formulas. But no state currently does this.

4. ELIMINATE RACISM IN SCHOOL FINANCE FORMULAS

Some state aid programs exacerbate racial disparities, and worse, some are built on the systemic racist policies that created them.

Kansas, like many states, imposes strict revenue limits, or caps, on revenue that can be raised locally in order to maintain equity. But a 2005 provision added to their school funding formula raised the cap for 16 districts with higher average housing values, based on the claim that those districts needed to pay teachers more to live in their districts. But this specific provision almost uniformly applied to predominantly white districts where most neighborhoods had racially restrictive covenants in earlier decades.

The provision excluded neighboring districts where homes had been devalued by redlining because they were inhabited by Black residents. These neighboring districts also presently use their maximum taxing authority.

We recommend federal audits of state school finance systems to identify features of those systems that exacerbate racial disparities and may in fact be built on systemic racial discrimination. Since states have thus far been unwilling to lead these initiatives themselves, we believe they need federal encouragement.

The funding adjustment on high-priced houses in Kansas provides one example, but there are others, including state aid programs designed to reduce local property tax rates in affluent suburban communities. ●

HOW FAR WILL SUPREME COURT'S SUPER-CONSERVATIVE MAJORITY GO TO PUSH RELIGIOUS FREEDOM IN PUBLIC SCHOOLS? MAINE CHOICE CASE PROVIDES FRESH TEST

By Linda Jacobson

Olivia Carson, the Maine student at the center of a U.S. Supreme Court case over religious school choice, graduated from Bangor Christian Schools this year. So even if the court rules states can no longer exclude schools that teach religion from their voucher programs, Carson will have moved on to study business at Husson University.

But other families, and those on all sides of the school choice issue, are already speculating about how far the court's conservative majority will go.

One of those families is the Nelsons, the other plaintiffs in *Carson v. Makin*, which the court will hear Dec. 8. This fall, Troy and Angela Nelson's son Royce will be a sophomore at Erskine Academy in South China, Maine — the secular private school the family chose when they had to forgo “the religious school they believed was best for their kids,” said Michael Bindas, a senior attorney with the libertarian Institute for Justice, who represents the plaintiffs in the lawsuit over the state's town “tuitioning” policy.

Troy and Amy Nelson sent their children Alicia and Royce to Erskine Academy, a secular private school that participates in the tuition assistance program. Alicia has graduated and Royce will be a sophomore this fall. (Institute for Justice)

The Supreme Court moved in the direction of greater religious freedom last year with its opinion in *Espinoza v. Montana Department of Revenue*, which focused on a tax credit scholarship program. But the decision was

limited. While the court said states can't ban religious schools from choice programs simply because they're religious, they left open the question of whether states could exclude them because they might spend the money on religious instruction. Focusing on that second question, the 1st Circuit Court of Appeals sided with Maine. Now Carson asks the Supreme Court to take the next step and rule that religious schools can participate in choice programs regardless of their curriculum. Some argue a ruling for the plaintiffs in Carson would be another step toward allowing religious organizations to run charter schools — a worst-case scenario for many advocates.

In the short term, the outcome in Carson would affect New England states with tuition assistance programs, in which towns without a school cover the cost of tuition at public or private schools.

In June, the 2nd Circuit ruled that students in Vermont can use public funds at religious schools. So far the state hasn't appealed the ruling, perhaps waiting for the Supreme Court to weigh in on Carson. And maybe in anticipation of the justices siding with the plaintiffs, Gov. Chris Sununu in neighboring New Hampshire signed legislation in July removing the restriction on religious schools in that state's tuitioning program.

A decision for the plaintiffs could prompt some states to get out of the voucher business if they can't place restrictions on curriculum, noted Preston Green, an education professor at the University of Connecticut.

Other states with private school voucher programs, such as Florida, Indiana and North Carolina, already allow religious schools to participate.

"Most legislatures do the right thing when they adopt these programs," said Bindas, with the Institute for Justice, adding that Espinoza's opponents argue the decision didn't specifically say states can't ban religious schools because they teach religion. "If the Supreme Court rules correctly, that argument will be removed from the arsenal of the school choice opponents."

A more recent ruling in a case involving a Catholic social services agency has some legal experts suggesting moderates on the court won't go too far.

Derek Black, a constitutional law professor at the University of South Carolina, said he doesn't think the court is ready to "jump off the cliff and say the state

can't even restrict money being spent on the bread for communion."

While it didn't directly focus on education, the court's 9-0 June ruling in *Fulton v. City of Philadelphia* is relevant, Black said. In that case, the justices held that the city couldn't exempt some foster care agencies from its nondiscrimination policy while denying the same exception to a Catholic agency just because it was opposed to placing children with same-sex couples.

While the decision was unanimous, conservative Justices Samuel Alito, Clarence Thomas and Neil Gorsuch argued for a broader interpretation in favor of greater religious freedom. But Justice Amy Coney Barrett, joined by Justices Brett Kavanaugh and Stephen Breyer, opted for more narrow protections that still allow government agencies to generally enforce nondiscrimination laws.

"Do the justices want to create breathing space for religion? Yes," Black said. "Do they want religion to overcome the state? No."

'DOMINOES FALLING'

The possibility of a ruling in favor of the Carsons nonetheless alarms those who believe such programs violate the First Amendment.

Green doesn't think a decision for the plaintiffs would immediately lead to churches or other religious organizations running charter schools, but added, "You're really, really close."

"This is about dominoes falling and it's a deliberative legal strategy," he said. "They don't need to do it right away. They just need to establish a true line where they can make these legal arguments."

Nicole Garnett, a law professor at the University of Notre Dame and a colleague of Justice Barrett when she taught there, addressed the issue last December. She argued in a report for the conservative Manhattan Institute that even the Espinoza decision allowed for religious charter schools.

With Barrett Poised to Join Conservative SCOTUS Majority, Lower Courts Weigh Granting More Students Access to Private and Religious Schools

Garnett said that while states established charters as new public schools, they share similarities with private schools because parents choose them.

“As programs of private choice, charter school programs may include religious schools,” she wrote, adding, “If charter schools are permissible, religious charter schools must be permitted.”

But Nina Rees, president and CEO of the National Alliance for Public Charter Schools, rejects the notion that charters are private.

“Charter schools are public schools and are subject to the First Amendment’s Establishment Clause,” she said. “Charter schools have never been able to, and cannot now, teach religion. Neither Espinoza nor a win for plaintiffs in Carson changes that.”

She stands by that position despite an Aug. 9 ruling by the 4th Circuit Court of Appeals in a case over whether charter schools’ uniform policies can require girls to wear skirts. The court ruled that charters are not “state actors” and that requiring girls to wear skirts violates their constitutional rights. This decision could strengthen the argument for religious charters.

In a recent op-ed, Black and Rebecca Holcombe, former Vermont education secretary, wrote that religious charter schools would “take a wrecking ball to public school funding.”

“States would suddenly become financially responsible for millions of students who previously chose to forgo public education,” they wrote. “In places already struggling to maintain public infrastructure, public budgets would now be on the hook for religious infrastructure.”

But one thing is clear, Garnett wrote: Whether advocates pursue the issue through legislation, an attorney general’s opinion or in the courts, “the legality of religious charter schools will be tied up in litigation, perhaps for years.”

Olivia Carson’s parents, David and Amy Carson, can relate. They filed their initial complaint about the state’s tuitioning program in 2018, when Olivia started 10th grade.

Bangor Christian Schools — where a church, classroom buildings and a radio station sit on a 35-acre, wooded campus — is a family tradition. Olivia’s parents

attended the school. So did David Carson’s mother. Her aunt and uncle work there, and Olivia spent all of her K-12 years there.

Olivia Carson graduated from Bangor Christian Schools in June. (Amy Carson)

“We kept [Olivia] at Bangor Christian just because of the environment and the academics,” said Amy Carson, who manages the paperwork for her husband’s construction business. “It’s been good for her, being an only child. It’s like a whole other family.” ●

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WHY MENTAL WELL-BEING PROMOTION MUST EXTEND TO YOUTH SPORTS

Parents, coaches, and athletic directors all have important roles to play.

By Sandra M. Chafouleas, Ph.D.

KEY POINTS

- Youth sports are missing from conversations about mental health and athletics.
- Decreases in youth sports participation are a national concern and require strategies to increase opportunity, motivation, and access.
- Parents, coaches, and athletic directors have responsibility to engage in actions that promote mental well-being in youth sports.

As a psychologist and a parent of children participating in youth sports, it has been exciting for me to witness the increasing media attention on mental health and athletics. Mental toughness has long been a central topic within sports circles, but the current discussions are different. The past year has brought the mental health and well-being of athletes into mainstream conversation, whether it be as a plotline in season two of Apple TV’s “Ted Lasso” (promise, no more spoilers!),

professional athletes' stories highlighted during World Mental Health Day, or Simon Biles' withdrawal from events at the Tokyo Olympics.

Youth sports, however, is missing from these conversations. Some media have covered the mental toll from the loss of youth sport opportunity during the pandemic. Others have drawn attention to the growing intensity of youth sports training today. But it is rare to hear about how youth sports can prevent mental health challenges and, in fact, promote well-being on the social (how we connect), emotional (how we feel), and behavioral (how we act) levels.

Given that the vast majority of athletes are participating in sports as youths and at the amateur level, we're missing a critical opportunity here. It is also problematic, as new data show a decline in U.S. youth sports participation. The majority of youths stop playing sports by age 13, with many kids calling sports "no longer fun."

Many sources identify youth sports as an important part of supporting a nation's well-being. The U.S. Department of Health and Human Services has acknowledged the need to increase youth sports participation, establishing the National Youth Sports Strategy as the first federal roadmap to ensuring all youths to have opportunity, motivation, and access. Other countries have made similar calls to ensure participation in youth sports.

Playing sports offers not only physical activity but also connections to many aspects of whole-child well-being, including academic achievement. For example, having a mentor is connected to higher academic performance, and coaches have been identified as important school-based natural mentors, particularly for males.

Improving youth sports culture means putting the emphasis on learning over competition, and creating safe, fun, and inclusive opportunities. These actions build the foundation for strong social and emotional skills, and are directly tied to promotion of mental well-being. Although not exhaustive, here are a few ways to start shifting the mental well-being conversation in youth sports:

FOR PARENTS

Set yourself up to be a great sports parent. Keep your behavior positive and supportive. Before the game,

consider sitting it out if you aren't ready and able to be that positive parent. During the game, cheer on everyone, or otherwise sit quietly and let them play. Afterward, use wins and losses alike as opportunities to learn and improve, not blame.

Be a good advocate for your child and the team. This is not the same as being a helicopter or lawnmower parent. It means understanding when your child is struggling and unable to handle things themselves, and knowing when and how to talk to the coach. It also means speaking up or seeking help when you observe inappropriate or abusive behavior by coaches, players, or families.

FOR COACHES

Implement positive coaching activities throughout the season, from initial team meetings to regular practice and game-time debriefs.

Engage in positive and direct communications about the athletic culture and team charter, with actions that match those communications. For example, if a team motto is "there is no 'I' in 'team,'" reconsider practices that routinely elevate a new, younger athlete in the program. If your team members need to attend practice in order to play, make sure to apply that without exception (e.g., don't offer special practice sessions only for elevated players).

Make your best efforts to get players into games, using varied strategies to ensure that participation by each team member is valued. Equal playing time may not be possible in all situations, but there are different ways to make sure every athlete feels like a team contributor.

Foster individuality and awareness rather than relying on prescriptive instructions. Doing so can help the athlete generalize the coaching to other skills throughout life.

FOR ATHLETIC DIRECTORS AND YOUTH SPORTS LEADERS

Provide professional learning opportunities for every coach on the core tenets of positive youth development. Encourage use of resources like How to Coach Kids to learn how competence, confidence, character, connection, and caring apply in the youth sports environment.

Acknowledge coach efforts to foster positive experience, relationships, and environments for each athlete. This support is particularly important to prevent decreased participation by certain youth subgroups, like teen girls.

Actively monitor what coaches are doing. Give positive feedback often. Do not tolerate any form of abusive behavior. Ensure opportunity for all to provide feedback on the team experience instead of relying on a few athletes or families who may be more outspoken. ●

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MORE TINSEL AND LESS TENSION: HOW TO GET THE BEST OUT OF THE HOLIDAY SEASON

By Madeline Holcolombe

For many people, Covid-19 changed how they see the holiday season.

Some ditched traditions to celebrate outside; some didn't feel safe enough to travel to be with loved ones; and others may have even felt relief to have an excuse not to engage in stressful annual gatherings.

This year, holiday travel is expected to be more like it was before the coronavirus reached the US, according to projections from AAA. How people celebrate may still look very different, however.

"Some of us still continue to face what seem to be insurmountable challenges, but everyone was exposed to doing something different," said Sandra Chafouleas, professor of educational psychology at the University of Connecticut. "It did let us let go of a lot of things."

Celebrating the holiday season brings a lot of benefits to individual wellbeing, but it can also bring a spike in pressure, perfectionism and family drama. Perhaps it is a good time to take advantage of the disruption to the way things have always been done, psychologists said.

"Over the time of Covid, there were more cases of people adjusting their holiday plans," Emiliana Simon-Thomas, science director of the Greater Good Science Center, said.

"I think there was some value to many of us in those different arrangements and the possibility that there was a different arrangement," she said, adding that she feels "there's strength in recognizing, hey, maybe it's time to do things a little bit differently."

This year, whether you decide to get together with friends and family from years past or reinvent what Christmas, Kwanza and New Year's Eve looks like for you, experts offer tips to weed out the stresses traditionally found in the holiday season and hold on to the joy.

A SEASON PACKED WITH MEANING, BUT WRAPPED IN DIFFICULTY

Whenever and however you celebrate, having a holiday season is important for wellbeing, Chafouleas said.

Holidays set aside time for relaxation, reflection and reliable traditions -- a trio that has become increasingly important as the world has gotten more chaotic and less predictable, Chafouleas said.

Whether you approach them from a spiritual, social or cultural perspective, celebrating holidays can offer a "super big dose" of positive emotions like joy, gratitude, serenity, hope, pride and love, she added.

HOLIDAY GATHERINGS CAN ALSO BE A MIXED BAG OF EMOTIONS.

"The way I do things versus the way we've always done things -- that's just a concoction for some disagreements," Chafouleas said.

Add to that, the pressure to find the perfect gift, the focus on materialism and surface-acting (or acting like everything is OK when problems hide beneath the surface) can detract from the joy and make the season more trouble than it feels worth, said Simon-Thomas.

HOW TO FIX WHAT YOU'VE ALWAYS DONE

Small changes can make a big difference, both experts said. For Chafouleas, it can look like identifying which part of the traditions feel like obligations rather than celebrations. "I used to make a million cookies with my kids, especially when they were younger, and I just don't enjoy that anymore, but my girls really like to do that," Chafouleas said. The work and the mess afterward started to take away from the joy of the traditions.

"So, I stepped away from that. I keep it simple," Chafouleas said. "They do it, and I get to eat them and participate in the experience of that ritual without have to be the one responsible." Data shows that focusing on giving and getting expensive, impressive gifts over the holidays isn't what actually brings people joy, said Simon-Thomas, but many still focus on "consumerism, materialism and perfectionism." Gifts can be fun and exciting, but the focus should really be on sharing experiences and laughter with one another in a way that brings the group closer together, she added.

Instead of fixating on the perfect food and the perfect décor, try going for good enough and appreciate the time you are spending together, she suggested. Instead of the perfect gift, try to find contentment giving your loved ones something you think offers them a good experience. Once people are together, bringing in small activities that encourage gratitude, listening and collaboration can do wonders.

That can mean taking 15 minutes for each person at the event to draw a name from a hat and share what that person did for them in the last year that they appreciate. It could be coming into the event with specific questions to ask each person about their lives, with follow up questions instead of a competitive tit-for-tat. In gatherings that are divided among contentious issues, Simon-Thomas said that it is often helpful to find a game or topic of conversation in which everyone can share a common goal and feel connected to one another.

How To Start Something New

Maybe a small change won't do. Perhaps the traditional get-together doesn't work for you or your travel is limited this year. That doesn't mean the holidays are a

bust, experts said. "Maybe you have a small friend group or maybe you're by yourself," Chafouleas said. "You can find the spaces that can foster the emotion that you're looking for."

It starts with knowing what is important to you. For people who are more introverted, volunteering doesn't have to be social -- it can be making blankets at home or working in an animal shelter, Chafouleas said.

Though some people have more of a preference for solitude than others, Simon-Thomas suggests everyone seek some sense of community to make the most of the holiday season. Instead of finding that in the traditional places, people can turn toward those they do feel relaxed and comfortable with and ask to share the holidays together, she added. Isolating out the rituals that feel authentic can also help, Chafouleas added. It may mean making a favorite recipe from years past with the new group or decorating in a way that feels exciting.

Finally, when reimagining your celebrations, try to include and immersive experience in nature, which Simon-Thomas said research shows is important to wellbeing. Indulging in a "sense of wonder" in nature is a great way to break the stress cycle, she said. ●

School of Pharmacy

ZANTAC UNLIKELY TO TURN INTO CANCER- CAUSING CHEMICAL IN THE BODY, BUT CONCERNS REMAIN ABOUT HOW DRUGS AGE ON THE SHELF

By C. Michael White and Adrian V. Hernandez

When consumers get a prescription drug from the pharmacy, they assume that it's been tested and is safe to use. But what if a drug changes in harmful ways as it sits on the shelf or in the body?

One dangerous result has been the creation of N-nitrosodimethylamine (NDMA), a probable carcinogen, in certain drugs. NDMA is found in chlorinated water, food and drugs in trace amounts. To minimize exposure, the U.S. Food and Drug Administration has set an acceptable level of NDMA in each pill at less than 96 nanograms.

But over the past few years, the FDA has found excessive amounts of NDMA in several drugs for hypertension, diabetes and heartburn. As a result, the agency has initiated recalls to protect the public. These products were contaminated with NDMA during the manufacturing process. The FDA recommended best practices for manufacturers to minimize this risk going forward.

Unfortunately for the buying public, emerging evidence suggests that NDMA can also be created as some pills sit on the store shelf or medicine cabinet. Thus, there is no way to test for its presence in the factory.

UNDERSTAND NEW DEVELOPMENTS IN SCIENCE, HEALTH AND TECHNOLOGY, EACH WEEK

I am a pharmacist who has written extensively about manufacturing issues and FDA oversight associated with both drugs and dietary supplements, including the issue

of NDMA contamination. In January 2021, I discussed how NDMA can end up in a patient's medication even if it wasn't present during manufacturing. Two new FDA studies clarify how this chemistry works and may help partially ease patients' concerns.

THE DRUG ZANTAC ON A DRUG STORE SHELF.

Zantac, the heartburn medicine, was pulled from the shelf, along with its generic versions, after the FDA found high levels of NDMA in the drug. Yichuan Cao/NurPhoto via Getty Images

NDMA LEVELS CREEP UP AFTER MANUFACTURE

Ranitidine (Zantac) was a commonly used heartburn and ulcer prescription and over-the-counter medication for decades before it was recalled by the FDA on April 1, 2020. It may now be the canary in the coal mine for the post-manufacturing creation of NDMA.

In one study, investigators found that ranitidine contained only 18 nanograms of NDMA after it was manufactured. However, when stored at 158 degrees Fahrenheit (70 degrees Celsius) for 12 days – as if the drug had been left in a hot car – NDMA dosages rose above 140 ng. This is only slightly above the 96 ng limit the FDA has deemed safe, but this was after just 12 days.

In another study, storing ranitidine where it was exposed to higher temperatures or high humidity enhanced the creation of NDMA over time. This suggests that some medications can leave the factory with a safe amount of NDMA but if kept for too long at home or on the store shelf can exceed known acceptable limits by the time patients use them.

In a January 2021 study in JAMA Network Open, investigators simulated the stomach environment and found that when ranitidine was exposed to an acidic environment with a nitrite source, these chemicals could create more than 10,000 ng of NDMA. However, FDA researchers more recently found that the earlier experiment used nitrite levels far beyond what would ever be found in the body. When they reran the study with normal dietary levels of nitrite, only a minimal amount of NDMA was created.

Further reassuring news came in May 2021, with the retraction of a clinical study from five years earlier. Originally, the researchers collected urine samples from 10 adults both before and after using ranitidine. After people swallowed ranitidine, their urinary NDMA levels rose from about 100 ng to more than 40,000 ng over the next day. But now the scientists suggest that the NDMA levels they measured reflected what was created in the urine samples awaiting testing, rather than NDMA actually made inside the body. Furthermore, a new FDA trial that gave ranitidine to patients along with a high nitrite meal and did not find any concerning increases in urinary NDMA. A physician explains why Zantac was recalled.

OTHER DRUGS NEED CLOSER INVESTIGATION

The body's ability to create NDMA after taking ranitidine seems limited. But the fact that NDMA can be generated as ranitidine sits on the shelf or medicine cabinet is still concerning, and this same phenomenon might occur in other drugs as well.

In another study, investigators added chloramine, a disinfectant routinely added to sterilize drinking water, to water samples that contained one of several medications that are structurally similar to ranitidine. They found that several commonly used drugs, including antihistamines (doxylamine and chlorpheniramine), a migraine drug (sumatriptan), another heartburn drug (nizatidine) and a blood pressure drug (diltiazem) all generated NDMA.

It is unclear whether the amount of NDMA created by these drugs when stored in hot and humid environments is dangerous, as with ranitidine. I believe that more studies need to be done right away to find out. It is always better to be safe than sorry, particularly when dealing with a possible carcinogen. ●

ARE GRAPHENE-COATED FACE MASKS A COVID-19 MIRACLE – OR ANOTHER HEALTH RISK?

By C. Michael White

As a COVID-19 and medical device researcher, I understand the importance of face masks to prevent the spread of the coronavirus. So I am intrigued that some mask manufacturers have begun adding graphene coatings to their face masks to inactivate the virus. Many viruses, fungi and bacteria are incapacitated by graphene in laboratory studies, including feline coronavirus.

Because SARS CoV-2, the coronavirus that causes COVID-19, can survive on the outer surface of a face mask for days, people who touch the mask and then rub their eyes, nose, or mouth may risk getting COVID-19. So these manufacturers seem to be reasoning that graphene coatings on their reusable and disposable face masks will add some anti-virus protection. But in March, the Quebec provincial government removed these masks from schools and daycare centers after Health Canada, Canada's national public health agency, warned that inhaling the graphene could lead to asbestos-like lung damage.

Is this move warranted by the facts, or an over-reaction? To answer that question, it can help to know more about what graphene is, how it kills microbes, including the SARS-COV-2 virus, and what scientists know so far about the potential health impacts of breathing in graphene.

HOW DOES GRAPHENE DAMAGE VIRUSES, BACTERIA AND HUMAN CELLS?

Graphene is a thin but strong and conductive two-dimensional sheet of carbon atoms. There are three ways that it can help prevent the spread of microbes:

– Microscopic graphene particles have sharp edges that mechanically damage viruses and cells as they pass by them. – Graphene is negatively charged with highly

mobile electrons that electrostatically trap and inactivate some viruses and cells. – Graphene causes cells to generate oxygen free radicals that can damage them and impairs their cellular metabolism.

WHY GRAPHENE MAY BE LINKED TO LUNG INJURY

Researchers have been studying the potential negative impacts of inhaling microscopic graphene on mammals. In one 2016 experiment, mice with graphene placed in their lungs experienced localized lung tissue damage, inflammation, formation of granulomas (where the body tries to wall off the graphene), and persistent lung injury, similar to what occurs when humans inhale asbestos. A different study from 2013 found that when human cells were bound to graphene, the cells were damaged.

In order to mimic human lungs, scientists have developed biological models designed to simulate the impact of high concentration aerosolized graphene – graphene in the form of a fine spray or suspension in air – on industrial workers. One such study published in March 2020 found that a lifetime of industrial exposure to graphene induced inflammation and weakened the simulated lungs' protective barrier.

It's important to note that these models are not perfect options for studying the dramatically lower levels of graphene inhaled from a face mask, but researchers have used them in the past to learn more about these sorts of exposures. A study from 2016 found that a small portion of aerosolized graphene nanoparticles could move down a simulated mouth and nose passages and penetrate into the lungs. A 2018 study found that brief exposure to a lower amount of aerosolized graphene did not notably damage lung cells in a model.

From my perspective as a researcher, this trio of findings suggest that a little bit of graphene in the lungs is likely OK, but a lot is dangerous. Although it might seem obvious to compare inhaling graphene to the well-known harms of breathing in asbestos, the two substances behave differently in one key way. The body's natural system for disposing of foreign particles cannot remove asbestos, which is why long-term exposure to asbestos can lead to the cancer mesothelioma. But in studies using mouse models to measure the impact of high dose lung exposure to graphene, the body's natural disposal system does

remove the graphene, although it occurs very slowly over 30 to 90 days.

The findings of these studies shed light on the possible health impacts of breathing in microscopic graphene in either small or large doses. However, these models don't reflect the full complexity of human experiences. So the strength of the evidence about either the benefit of wearing a graphene mask, or the harm of inhaling microscopic graphene as a result of wearing it, is very weak.

NO OBVIOUS BENEFIT BUT THEORETICAL RISK

Graphene is an intriguing scientific advance that may speed up the demise of COVID-19 virus particles on a face mask. In exchange for this unknown level of added protection, there is a theoretical risk that breathing through a graphene-coated mask will liberate graphene particles that make it through the other filter layers on the mask and penetrate into the lung. If inhaled, the body may not remove these particles rapidly enough to prevent lung damage.

The health department in Quebec is erring on the side of caution. Children are at very low risk of COVID-19 mortality or hospitalization, although they may infect others, so the theoretical risk from graphene exposure is too great. However, adults at high immediate risk of harm from contracting COVID-19 may choose to accept a small theoretical risk of long-term lung damage from graphene in exchange for these potential benefits. ●

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WHY IS THE FDA FUNDED IN PART BY THE COMPANIES IT REGULATES?

By C. Michael White

The Food and Drug Administration has moved from an entirely taxpayer-funded entity to one increasingly

funded by user fees paid by manufacturers that are being regulated. Today, close to 45% of its budget comes from these user fees that companies pay when they apply for approval of a medical device or drug.

As a pharmacist and medication and dietary supplement safety researcher, I understand the vital role that the FDA plays in ensuring the safety of medications and medical devices.

But I, along with many others, now wonder: Was this move a clever win-win for the manufacturers and the public, or did it place patient safety second to corporate profitability? It is critical that the U.S. public understand the positive and negative ramifications so the nation can strike the right balance.

Black and white photo of men crowded around a conference table.

THE FDA BLOCKS THALIDOMIDE

Americans in the early 20th century were outraged when they found out that manufacturers used poor-quality methods for producing food and medication, and used unsafe, ineffective and undisclosed addictive ingredients in medications. The resulting Food, Drug and Cosmetic Act of 1938 gave the taxpayer-funded Food and Drug Administration new authority to protect the U.S. consumer.

One of the FDA's most shining successes occurred in the late 1950s when the agency refused to approve thalidomide. By 1960, 46 countries allowed pregnant women to use thalidomide to treat morning sickness, but the FDA refused on the grounds that the studies were insufficient to demonstrate safety. Debilitating birth defects resulting from thalidomide arose in Europe and elsewhere in 1961. President John F. Kennedy heralded the FDA in 1962 for its stance. An FDA driven by the data – and not corporate pressure – prevented a major tragedy.

HOW AIDS CHANGED HOW THE FDA IS FUNDED

The FDA continued its work fully funded by U.S. taxpayers for many years until this model was upended by a new infectious disease. The first U.S. case of HIV-induced AIDS occurred in 1981. It was rapidly spreading, with devastating complications like blindness,

dementia, severe respiratory diseases and rare cancers. Well-known sports stars and celebrities died of AIDS-related complications. AIDS activists were incensed about long delays in getting experimental HIV drugs studied and approved by the FDA.

In 1992, in response to intense pressure, Congress passed the Prescription Drug User Fee Act. It was signed into law by President George H.W. Bush.

With the act, the FDA moved from a fully taxpayer-funded entity to one funded through tax dollars and new prescription drug user fees. Manufacturers pay these fees when submitting applications to the FDA for drug review and annual user fees based on the number of approved drugs they have on the market. However, it is a complex formula with waivers, refunds and exemptions based on the category of drugs being approved and the total number of drugs in the manufacturers portfolio.

Over time, other user fees for generic, over-the-counter, biosimilar, animal and animal generic drugs, as well as for medical devices, were created. As time passed, the FDA's funding has increasingly come from the industries that it regulates. Of the FDA's total US\$5.9 billion budget, 45% comes from user fees, but 65% of the funding for human drug regulatory activities are derived from user fees. These user fee programs must be reauthorized every five years by Congress, and the current agreement remains in effect through September 2022.

HAVE USER FEES WORKED?

The FDA and the drug or device manufacturers negotiate the user fees. They also negotiate performance measures that the FDA has to meet to collect them, and proposed changes in FDA processes. Performance measures include things such as how quickly the FDA responds to meeting requests, how quickly it generates correspondence, and how long it takes from submission of a new drug application until the FDA approves or refuses to approve a drug or product.

Because of the additional funding generated by user fees and performance measures that the FDA has to meet, the FDA is quicker and more willing to discuss what it wants to see in an application with manufacturers. It also offers clearer guidance for

manufacturers. In 1987, it took 29 months from the time a new drug application was filed by the manufacturer for the FDA to decide whether to approve a medication in the U.S. In 2014, it only took 13 months and by 2018, it was down to 10 months.

Changes in more recent years have also increased the number of standard new drug applications approved the first time around by the FDA from 38% in 2005 to 61% in 2018. In diseases where there are not many medication options for patients, the FDA has a priority review process, where 89% of new drug applications were approved the first time around and the approvals were completed in eight months in 2018. All this occurred while the number of new drug applications have been increasing over time.

Most recently, the COVID-19 pandemic has seen the FDA provide emergency use authorization for potential treatments in a matter of weeks, not months. The infrastructure and capacity to review the available information so rapidly is due in large part to the funding from user fees.

While the number and speed of drug approvals have been increasing over time, so have the number of drugs that end up having serious safety issues coming to light after FDA approval. In one assessment, investigators looked at the number of newly approved medications that were subsequently removed from the market or had to include a new black box warning over 16 years from the year of approval. These black box warnings are the highest level of safety alert that the FDA can employ, warning users that a very serious adverse event could occur.

Before the user fee act was approved, 21% of medications were removed or had new black box warnings as compared to 27% afterwards.

Some potential reasons that more adverse effects are coming to light after drug approval include senior FDA officials overturning scientist recommendations, a lower burden of proof for medication approval, and more clinical data in new drug applications coming from foreign clinical trial sites that require additional time to assess in an environment where regulators are rushing to meet tight deadlines.

LACK OF MONEY LIMITS FDA

User fees are a viable way to shift some of the financial burden to manufacturers who stand to make money from the approval and sale of drugs in the lucrative U.S. market. Successes have occurred and provided U.S. citizens with medication more quickly than before.

However, without careful consideration of what is being negotiated, the FDA can become weak and ineffective, unable to protect its citizens from the next thalidomide. There are some signs that the pendulum may be swinging too far in the direction of the manufacturers. Additionally, while drug approval functions at the FDA are well funded, the FDA is insufficiently funded to protect consumers from other issues such as counterfeit drugs and dietary supplements because they cannot collect user fees to do so. In my view, these functions need to be identified and require additional taxpayer funding. ●

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THE FDA'S BIG GAMBLE ON THE NEW ALZHEIMER'S DRUG

By C. Micheal White

The Food and Drug Administration set off a firestorm of debate when it approved a new drug, aducanumab, for Alzheimer's disease via an accelerated approval pathway. This decision ignored the recommendation of the FDA's external advisory panel to reject the drug.

The FDA grants accelerated approvals for drugs to treat serious illnesses for which there are no known, or at least very few, treatments. The type of data used to support accelerated approvals is very different from the typical benchmark safety and efficacy data required for approval. As a pharmacist and researcher, I have documented several reasons drug research conducted in a laboratory environment differs substantially from what is ultimately seen in people. The challenge lies in striking a balance between taking the time to ensure a treatment works and meeting urgent patient need.

USING A DIFFERENT STANDARD

The FDA created an accelerated approval pathway for drugs treating serious diseases for which many patients feel a desperate need for more options. This has included treatment for advanced-stage cancer, multiple sclerosis and HIV, among others.

When considering accelerated approval, the agency examines a drug's efficacy using what's called a "surrogate endpoint." While most drug trials measure success based on clinical endpoints that determine whether a drug helps people feel better or live longer, like reducing heart attacks or strokes, surrogate endpoints measure biomarkers that suggest potential clinical benefit. These surrogate endpoints are viable substitutes for hard clinical endpoints because they're proven to be directly linked to the desired clinical outcomes. For example, the clinical endpoints of reducing heart attacks and strokes could use reduced blood pressure and low-density lipoprotein (LDL) cholesterol as surrogate endpoints.

While many hypotheses on the correct surrogate endpoints to treat certain diseases have panned out, several others have been shown to be off-base or only partially correct. A great example is homocysteine, an amino acid once thought to be a driver of cardiovascular diseases which since has been shown to be a marker of disease only. People with elevated levels of homocysteine are more likely to have cardiovascular disease, but lowering levels doesn't make heart attacks and strokes less likely to occur. All those who rushed the science and purchased dietary supplements to lower their homocysteine were flushing their money down the drain.

TESTING THE AMYLOID BETA HYPOTHESIS

Though the effect of aducanumab, the Alzheimer's drug developed by biotechnology company Biogen, on hard clinical endpoints are lackluster, it has been shown to reduce the formation of amyloid beta plaques in patients with early-stage Alzheimer's. Amyloid beta denotes proteins that clump together to form plaques commonly seen in patients with Alzheimer's. It's been hypothesized that these plaques drive the signs and symptoms of Alzheimer's. Animal models have shown that interfering with amyloid beta plaque formation could lead to improvements in functioning.

The data linking amyloid beta plaques to hard clinical endpoints is not a slam-dunk. Unlike hypertension and elevated LDL cholesterol, which has been proved to be linked to cardiovascular events, amyloid beta has not seen such definitive results.

Two large clinical trials assessing aducanumab have been conducted, one that started with a higher dose and one that started with a lower dose that was later increased. Both trials were stopped early, and the lower-dose trial found no benefits. The higher-dose trial found modest benefits in maintaining mental functioning, but the trial did not have enough patients to show that these benefits were due to the drug and not to chance. After the fact, the researchers combined data from patients who received high-dose aducanumab in both trials and found an improvement in mental functioning. However, many experts running clinical trials bristle at combining trial outcomes like this: These after-the-fact analyses have been shown in some circumstances to not pan out in the future.

Other initially promising experimental drugs targeting amyloid beta for Alzheimer's also fell short in reducing hard clinical endpoints in their clinical trials. After one of these drugs, solanezumab, failed to achieve study aims, additional data analysis post-trial suggested it might be effective in a select population with mild Alzheimer's. Researchers conducted an additional large clinical trial focusing on that subpopulation, but again failed to demonstrate significant benefits. No one knows if aducanumab will find significant benefits when the new clinical trial completes or if it will fail as solanezumab did.

If amyloid beta turns out to be simply a marker and not a cause of Alzheimer's, it will be a costly mistake: Aducanumab is estimated to cost over US\$56,000 a year.

WAS THE FDA'S RULING A MISTAKE?

Over 6 million Americans now have Alzheimer's disease, and deaths from Alzheimer's have risen over 145% over the past 20 years. Alzheimer's disease not only robs individuals of their autonomy but also places a huge burden on family members and the U.S. economy: \$355 billion is spent annually on caring for people with Alzheimer's. Current FDA-approved treatments are only modestly effective at controlling disease symptoms, and none target a possible underlying cause.

The accelerated approval pathway allows patients with early-stage Alzheimer's to access aducanumab while a larger and more definitive clinical trial is conducted. Biogen says it hopes to have the clinical trial completed by 2030. If the study does not find reductions in the hard clinical endpoints, the drug will be withdrawn.

If aducanumab is ultimately found to be effective, many patients with early-stage Alzheimer's will reap the benefits in reductions in hospitalizations, doctor visits, nursing home costs and societal burden.

If aducanumab is found to be ineffective, however, Medicare, insurers and patients will have spent tens of millions of dollars on a drug that not only did not work but also exposed patients to adverse events, including the risk of bleeding in the brain.

SHOULD PHYSICIANS PRESCRIBE ADUCANUMAB, AND SHOULD INSURERS PAY FOR IT?

For patients in the earlier stages of Alzheimer's disease, there is reason to try aducanumab based on the current clinical trial data and the lack of alternatives. But in advanced disease, it is unlikely that aducanumab or any drug targeting amyloid beta will provide benefits.

In a cost-effectiveness assessment of aducanumab, the Institute for Clinical and Economic Review, an independent organization assessing the value of medical treatments, suggested an annual price range from \$8,300 to \$23,000. This is a far cry from the \$56,000 a year the company is expecting to charge, and that doesn't account for the thousands of dollars in additional testing required to reduce the risk of brain swelling and bleeding.

The annual cost of the drug will likely greatly exceed the cost savings in other areas like reduced doctor visits and hospitalizations. Until further results are released, such high costs could lead private insurers to not cover or charge higher copays for the drug. Given the average age of those with Alzheimer's disease, however, most people receiving aducanumab will be eligible for Medicare and will most likely be covered. Whether the drug will actually treat the disease – the biggest issue in question – remains uncertain.

Let us all hope that the FDA's gamble pays off. ●

WHAT FAMILIES DEALING WITH ALZHEIMER'S SHOULD KNOW ABOUT THE NEWLY APPROVED DRUG

By Felice J. Freyer

The Food and Drug Administration's approval of a new drug to treat Alzheimer's disease, Aduhelm, sparked reactions ranging from jubilation to dismay. Some cheered the approval of the first new Alzheimer's drug in nearly two decades. Others denounced the FDA decision as premature, based on insufficient evidence.

People with the illness and their loved ones may feel caught in the middle, unsure what to do next. Here are the key points to understand.

It's not clear whether Aduhelm will have a significant effect on the course of the illness — but it might. The FDA approved the drug because it reduces a sticky protein, amyloid beta, that clumps in the brains of people with Alzheimer's. It's logical to think that might help, because the disease worsens as more plaques develop. But it's not known whether the amyloid causes Alzheimer's — or is merely a sign of it. And the studies showed mixed results on the drug's effects on cognitive decline.

In approving the treatment last week, the FDA didn't require the high level of evidence that it usually does. Instead, it made its approval conditional on the completion of another clinical trial to prove the drug works, a process that will take years. Critics called this unusual approach reckless.

But Jim Wessler, CEO of the Alzheimer's Association's Massachusetts/New Hampshire chapter, pointed out the other side: "There is a bit of difference between some of the academically based specialists and the general public that are saying, 'Give me a chance here. I have a progressive degenerative disease.' "

The FDA faced big risks no matter what it did, said C. Michael White, head of the Department of Pharmacy Practice at the University of Connecticut.

If it had rejected the drug now, and years later a study showed that it worked, in the interim millions of people would have missed an opportunity to stave off a horrible illness. Instead, the FDA chose the opposite risk — that the drug might later be found ineffective, and meanwhile billions of dollars get wasted.

White said he's "cautiously optimistic" that Aduhelm will have some benefit, but "people should know that they are gambling."

Wessler used a baseball analogy. "This is a hit. Everyone wants to see a home run or a grand slam," he said. "This is not a grand slam. This is a single. A significant step in the right direction."

The drug, Wessler said, could allow an Alzheimer's patient to stay healthy long enough to enjoy a child's wedding or graduation, or meet a grandchild, or take a bucket-list trip. "This drug promises to provide more time," he said.

That was another important reason for the FDA's approval: Alzheimer's is a terrible illness, and there's nothing else available to treat it.

Even if Aduhelm does work, it probably won't help people with late-stage disease. Although the FDA approved the drug for anyone with Alzheimer's disease, the clinical trials enrolled only those with early, mild cases. Once the disease has advanced, it is questionable whether this drug can have an effect on slowing further decline — and it definitely cannot reverse the course of the illness.

"We know from other failed drug attempts to control amyloid beta that by the time severe Alzheimer's disease occurs, it is too late," White said.

Aduhelm has some risks. Three in 10 participants in the clinical trials experienced brain bleeds or swelling. These side effects were transient and can be easily managed, said Dr. Stephen Salloway, director of neurology and the Memory and Aging Program at Butler Hospital in Providence, and one of the leading researchers studying Aduhelm. Frequent MRIs can detect early signs of problems, and the dosage can be adjusted or paused, he said.

But others expressed worries that once millions of people are taking the drug, more dire side effects could emerge.

It's not just a pill. To take Aduhelm, you have to travel every four weeks to an infusion center and sit for an hour while the drug is delivered into a vein in your arm. Additionally, you will likely have to undergo a PET scan or lumbar puncture beforehand to confirm the presence of amyloid. And you will need regular MRIs to monitor for side effects.

Aduhelm is costly, and it's not clear how much patients will have to pay. Biogen, the manufacturer, set a price of \$56,000 a year for each patient. Most people with Alzheimer's disease are enrolled in Medicare Part B, which pays 80 percent of the cost. Many Medicare beneficiaries have supplemental insurance that picks up some or all of those co-pays. For people under 65 with private insurance, their costs will vary depending on their coverage. Some insurers may even decide not to cover the drug at all.

If you're interested in this drug, here's what to do. Get diagnosed, Wessler said. That may seem obvious, but national data show that half of people with dementia never get diagnosed, and half of those diagnosed are never told about it, he said. The availability of Aduhelm is sure to change that, he said.

If you're concerned about your memory or that of someone you love, you can start by reading up on the 10 warning signs of Alzheimer's. Then see your doctor and begin the discussion of risks and benefits. It will take time before Aduhelm is widely available, but it's not too soon to start talking about it. ●

WHAT DOES FULL FDA APPROVAL OF A VACCINE DO IF IT'S ALREADY AUTHORIZED FOR EMERGENCY USE?

By Jennifer Girotto

Thirty percent of unvaccinated American adults say they're waiting for the COVID-19 vaccines currently authorized for emergency use to be officially approved by the U.S. Food and Drug Administration. The FDA has since granted that approval for those age 16 and older for the Pfizer-BioNTech vaccine on Aug. 23, 2021. What had to happen for the FDA to advance from emergency use authorization, or EUA, to full approval?

I'm a pharmacist who trains other pharmacists, health care providers and students on why, when and how to administer vaccines. Emergency use authorization, while streamlining the regulatory process so the vaccine is more quickly available to the public, still follows a rigorous process the FDA requires to ensure vaccine safety and effectiveness. The difference is that more time has passed and more data is available for review when a company applies for full approval.

EUA AND FULL APPROVAL SHARE SIMILAR FIRST STEPS

For both emergency authorization and full approval, for COVID-19 vaccines, the FDA first requires initial safety studies on a small number of people. Here, researchers document potential adverse events, or side effects, that the vaccine may cause. Researchers also determine the safest and most effective dose of the vaccine.

Once the vaccine is determined to be safe and an optimal dose identified, researchers will create larger studies to ascertain how well it works in a controlled setting where some people are given the vaccine while others are given a placebo.

It is important to note that the number of people who participated in the initial COVID-19 safety studies was

similar to that in the safety studies of other commonly used vaccines, including vaccines for tetanus, diphtheria, whooping cough and meningitis. Over 43,000 adults participated in the early phases of the Pfizer-BioNTech clinical trial, over 30,400 in Moderna's and over 44,000 in Johnson and Johnson's. Half the participants in each study were given a vaccine, while the other half were given a placebo.

WHERE EUA AND FULL APPROVAL DIFFER

From this point on, emergency use authorization and full FDA approval for COVID-19 vaccines follow different clinical study requirements.

For the emergency use authorization, the FDA requires at least half of the participants of the original studies to be followed for at least two months post-vaccination. This is because the vast majority of vaccine-related side effects occur right after vaccination.

Full FDA approval, on the other hand, requires participants in the original studies to be followed for at least six months. Reviewers look at data from the same study participants but collected over a longer period of time. All adverse events are examined. The manufacturer must also provide more detailed manufacturing plans and processes, as well as a higher level of oversight and inspections. All of this adds significantly more time to the review process.

Both Pfizer and Moderna began their rolling submission for approval in the FDA's "Fast Track" process, designed to speed up review. This allows the companies to submit portions of their approval application to the FDA for review as they're completed.

Full FDA approval will initially apply to only the same age groups that were tested in the original emergency use authorization. This means that the vaccine has been approved first for people ages 16 and up for Pfizer, and will likely be approved for those 18 and up for Moderna. Rolling submission will allow approval of the vaccine for younger groups as more data becomes available.

DIFFERENT TIMELINES, SAME RIGOROUS REQUIREMENTS

Full FDA approval is a milestone that may help build confidence among the vaccine hesitant about the safety of the vaccines. But the true test of the vaccine came

when it first gained emergency use authorization. Then, researchers identified the majority of its potential side effects and proved its ability to protect against severe disease. ●

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RAT POISON IS JUST ONE OF THE POTENTIALLY DANGEROUS SUBSTANCES LIKELY TO BE MIXED INTO ILLICIT DRUGS

By C. Michael White

Over 150 people in Illinois started bleeding uncontrollably after using synthetic cannabis-based products – including fake marijuana, Spice and K2 – that contained the rat poison brodifacoum in March and April 2018. By the end of July 2021, these banned products were still being sold in 10 states and the District of Columbia, resulting in hundreds of severe bleeds and several deaths.

Illicit drug use was responsible for an estimated 166,613 deaths worldwide in 2017 due to overdose. The increased risk of disease and injury associated with illicit drug use caused an additional estimated 585,348 premature deaths. And it's impossible to tease out whether people were harmed by the drugs themselves or by the myriad impurities added to them.

I am a clinical pharmacologist and guest editor for a special supplement in the Journal of Clinical Pharmacology on commonly abused substances. I also recently surveyed the research on what's known about illicit drug adulteration. The research is clear: Adding impurities to, or adulterating, illicit drugs is a longstanding and widespread practice with harmful consequences.

YOU SELDOM GET WHAT YOU PAY FOR

Drugmakers include other ingredients for a few reasons, whether to cut costs by bulking up their product with

cheaper nonactive ingredients or to achieve particular effects by adding other drugs to mask poor product quality or imitate the desired effect of the drug itself.

Don't let yourself be misled. Understand issues with help from experts

Prior to the 2000s, drugs including cocaine and heroin were being "cut," or diluted, with inactive ingredients like sugars to enlarge supply and increase profits. Since then, buyers of cocaine and heroin products frequently receive a cocktail of adulterants that mimic the product's intended effects or mask side effects due to poor quality.

For example, the active ingredient of ecstasy, MDMA, is what produces the product's intended effects. However, a 2004 study assessing ecstasy tablets from drug seizures at raves found that 20% of the products contained no MDMA, and dosage varied widely in products that did. Cheaper and more dangerous stimulants and psychedelics like synthetic bath salts and LSD are frequently swapped for MDMA without alerting the buyer.

DRUGS ADDED TO INTENSIFY EFFECTS

Over 70% of cocaine products contain levamisole, a drug for worm infections that increases the intensity and duration of stimulant effects. It was banned in the U.S. in 1999 because it suppresses red and white blood cell production and increases the risk of life-threatening infections and anemia. These side effects are seen at doses over 150 milligrams, and 35% of seized cocaine products in the U.S. exceed that level.

Other additives are commonly added to cocaine to intensify effects. Aminorex, a stimulant and appetite suppressant, was withdrawn by the FDA in 1972 after it caused a number of pulmonary hypertension cases that resulted in heart failure and death. Similarly, caffeine is frequently added to intensify the adrenaline rush. While safe when taken alone in lower doses, higher doses of caffeine in combination with other stimulants can induce seizures and heart rhythm problems.

For heroin, veterinary anesthetic xylazine is commonly added to intensify its relaxing effect. And fentanyl is increasingly being used as a substitute. Because fentanyl is 50 times more potent than heroin, a smaller amount of total product can produce similar effects. But

adding even just a slightly larger amount of fentanyl than expected can easily result in an overdose.

COVERING UP ADULTERATION AND POOR MANUFACTURING QUALITY

Manufacturers also add impurities to compensate for lost effects due to adulteration. Anesthetics like lidocaine and benzocaine are added to adulterated products to reproduce the tingling sensation on the gums or tongue that drug dealers look for to assess cocaine quality. While these anesthetics are FDA approved, they can cause seizures and heart rhythm problems with the wrong dose.

A similar technique is used for heroin. Manufacturers commonly add malaria drug quinine to mimic heroin's bitter taste and the initial drop in blood pressure when it's administered.

Poor heroin production also creates a lot of impurities that can cause severe chills and pain at the injection site. To get around these side effects, manufacturers frequently add antihistamines like Benadryl and pain relievers like Tylenol. The pain reliever metamizole, which was recalled in 1977 for health risks, is sometimes used instead of Tylenol.

THE DOUBLE-EDGED SWORD OF FIELD TESTING

Adulterants can lead to dangerous side effects. But because additives aren't disclosed to the buyer and most of them have been banned by the FDA, clinicians might not recognize or even suspect that an adulterant is the cause of a patient's symptoms.

While consumer-based methods to test for drug impurities may help, they aren't foolproof. Volunteers at music festivals in the 2010s offered MDMA purity testing so attendees could decide whether they wanted to use the drugs they had. If they were injured, attendees could alert emergency personnel about potential adulterants they were exposed to. Unfortunately, over 40% of the adulterated samples were missed by those field testing kits and discovered days later only with sophisticated laboratory equipment.

With illicit drugs, the difference between what you believe you are buying and what is actually in the

product can be the difference between life and death. If you are suffering from drug addiction, resources are available to help you manage your addiction and achieve sobriety. ●

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WHY PRESCRIPTION DRUGS CAN WORK DIFFERENTLY FOR DIFFERENT PEOPLE

By C. Michael White

Different people taking the same drug can have markedly different responses to the same dose. While many people will get the intended effects, some may get little to no benefit, and others may get unwanted side effects.

As a pharmacist who researches the safety and effectiveness of drugs, I know there are several reasons why this occurs, including individual physical differences, drug interactions and inflammation.

GENETIC DIFFERENCES

The liver has a collection of enzymes called the cytochrome P450 system that metabolize, or break down, many drugs so they can be removed from the body.

The DNA, or genetic material, of cells contain the blueprint on how to create these enzymes. Unfortunately, some people have small errors in their DNA called polymorphisms that result in enzymes that don't work as well.

Where these errors show up in the enzyme matter. If they occur in parts of the enzyme that aren't directly involved in drug breakdown, they will have little effect on how well you metabolize a drug. Errors affecting the enzyme's active site that binds to drugs, however, can cripple its ability to break down a drug and subsequently mean there's more of the drug circulating in the blood. If the rising blood concentration exceeds

the drug's therapeutic range, serious side effects can occur.

Some people have a polymorphism that instructs their body to create two of the same enzyme instead of just one. These "ultrametabolizers" break down drugs faster than normal, resulting in a lower concentration of active drug in their bodies. If the concentration falls below the therapeutic range, there may not be enough drug for a beneficial effect.

Clinicians can test patients' DNA for these enzyme polymorphisms. If a known polymorphism is detected, they can alter the dose or avoid certain drugs altogether if they don't work as well as they should or are more likely to cause side effects.

DRUG INTERACTIONS

Genetic variability only explains a portion of the variability in drug response. Another factor to consider is drug interactions.

Some drugs block the active site of the liver enzyme cytochrome P450 so it can't be reused, preventing other drugs from binding to it and getting metabolized. As drug concentrations rise, so does the risk of side effects. For example, the heart rhythm drug amiodarone can block metabolism of the blood thinner warfarin, which results in very high warfarin concentrations that could lead to life-threatening bleeding.

Conversely, the antiepilepsy drugs phenytoin and carbamazepine can stimulate production of even more metabolic enzymes than usual. Other drugs may be metabolized faster than usual, and their beneficial effects may be lost.

INFLAMMATION

When the body is newly infected or injured, the inflammatory response brings white blood cells and increased blood flow to the area to sterilize and repair the problem. Inflammation is meant to last for only short periods of time. But the immune systems of some people may also attack unaffected areas and result in chronic inflammation that can damage tissues and joints, or even increase the risk of heart disease.

Inflammation from a new infection or chronic inflammatory disease like rheumatoid arthritis or

psoriasis could also impair how well enzymes like cytochrome P450 can metabolize drugs.

THE INFLAMMATORY RESPONSE IS ONE WAY THE IMMUNE SYSTEM REACTS TO INJURY OR DISEASE.

In addition to producing cytochrome P450 enzymes, the liver is one of the major organs that create special proteins called cytokines and interferons that participate in the immune response. When the liver is busy making all of these proteins, it does not have the capacity to make as many drug-metabolizing enzymes, which results in a decline in drug break down. When the infection goes away or the source of inflammation is blocked with anti-inflammatory drugs, however, the liver's ability to metabolize drugs goes back to normal. This means that someone with an infection or chronic inflammation might need a lower dose of drug than normal since their liver enzymes aren't clearing them as quickly as usual. And when that inflammation is resolved, they may need to increase their dose to maintain the same desired effects they had before.

One of the prime ways to see if you have increased inflammation is by checking your c-reactive protein (CRP) concentration. While CRP doesn't directly cause inflammation, the body produces more CRP as a result of inflammation. So a higher CRP level in the blood could indicate underlying inflammation and, subsequently, increased suppression of drug metabolism.

OTHER FACTORS AFFECTING DRUG METABOLISM

Even if drug interactions are avoided and inflammation is kept in check, there are many other factors that can influence drug effects.

Liver or kidney damage could reduce how well drugs are broken down and eventually expelled in the urine or bile.

Body size also affects drug response. Drug concentration in the body is determined by both the dose given and the volume of an individual's body fluids. Giving the same drug dose to a smaller-sized person could cause a higher blood concentration than when given to a larger person. This is why many drugs are given in lower doses to children than adults.

And finally, some people either don't have many receptors in their body for the drug to bind to and produce its effects, or the receptors that they do have don't work well. This could be due to genetic mutations or underlying disease. An average dose of a drug would only produce a limited response in these patients.

TALK TO YOUR CLINICIAN

One reason why there are so many types of drugs and available doses for different diseases is because your response to the drug might not be the same as the average person's. When you start a new drug regimen, it might have to be adjusted to the right level, and that will take patience and cooperation between you and your clinician.

To identify any potential drug interactions, tell your pharmacist all the prescription, over-the-counter and dietary supplement products you are taking.

If you develop a new infection or disease that causes inflammation, the dosages of the others drugs you are currently taking might need to be reduced. If you notice new side effects, let your clinician or pharmacist know right away.

If you have a severe chronic inflammatory disease like rheumatoid arthritis or psoriasis and start a potent anti-inflammatory drug, let your clinician or pharmacist know if the other drugs you're taking aren't working as well as before so your dose can be adjusted. ●

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IVERMECTIN IS A NOBEL PRIZE-WINNING WONDER DRUG – BUT NOT FOR COVID-19

By Jeffrey R. Aeschlimann

Ivermectin is an over 30-year-old wonder drug that treats life- and sight-threatening parasitic infections. Its lasting influence on global health has been so profound

that two of the key researchers in its discovery and development won the Nobel Prize in 2015.

I've been an infectious disease pharmacist for over 25 years. I've also managed patients who delayed proper treatment for their severe COVID-19 infections because they thought ivermectin could cure them.

Although ivermectin has been a game-changer for people with certain infectious diseases, it isn't going to save patients from COVID-19 infection. In fact, it could cost them their lives.

Let me tell you a short story about the history of ivermectin.

DEVELOPING IVERMECTIN FOR ANIMAL USE

Ivermectin was first identified in the 1970s during a veterinary drug screening project at Merck Pharmaceuticals. Researchers focused on discovering chemicals that could potentially treat parasitic infections in animals. Common parasites include nematodes, such as flatworms and roundworms, and arthropods, such as fleas and lice. All of these infectious organisms are quite different from viruses.

Merck partnered with the Kitasato Institute, a medical research facility in Japan. Satoshi Omura and his team isolated a group of chemicals called avermectin from bacteria found in a single soil sample near a Japanese golf course. To my knowledge, avermectin has yet to be found in any other soil sample in the world.

Research on avermectin continued for approximately five years. Soon, Merck and the Kitasato Institute developed a less toxic form they named ivermectin. It was approved in 1981 for commercial use in veterinary medicine for parasitic infections in livestock and domestic pets with the brand name Ivomec.

DEVELOPING IVERMECTIN FOR HUMAN USE

Early experiments by William Campbell and his team from Merck discovered that the drug also worked against a human parasite that causes an infection called river blindness.

River blindness, also known as onchocerciasis, is the second leading cause of preventable blindness in the

world. It is transmitted to humans from blackflies carrying the parasitic worm *Onchocerca volvulus* and occurs predominantly in Africa.

Ivermectin underwent trials to treat river blindness in 1982 and was approved in 1987. It has since been distributed free of charge through the Mectizan Donation Program to dozens of countries. Thanks to ivermectin, river blindness has been essentially eliminated in 11 Latin American countries, preventing approximately 600,000 cases of blindness.

These two decades of extensive work to discover, develop and distribute ivermectin helped to significantly reduce human suffering from river blindness. It's these efforts that were recognized by the 2015 Nobel Prize in Physiology or Medicine, awarded to both William Campbell and Satoshi Omura for their leadership on this groundbreaking research.

REPURPOSING DRUGS FOR OTHER USES

Infectious disease researchers frequently attempt to repurpose antimicrobials and other medications to treat infections. Drug repurposing is attractive because the approval process can happen more quickly and at a lower cost since nearly all of the basic research has already been completed.

In the years since it was approved to treat river blindness, ivermectin was also shown to be highly effective against other parasitic infections. This includes strongyloidiasis, an intestinal roundworm infection that affects an estimated 30 to 100 million people worldwide.

Another example is amphotericin B, originally approved to treat human yeast and mold infections. Researchers discovered it can also be an effective treatment for severe forms of leishmaniasis, a parasitic infection prevalent in tropical and subtropical countries.

Likewise, doxycycline is an antibiotic used for a wide variety of human bacterial infections such as pneumonia and Lyme disease. It was later found to also be highly effective in preventing and treating malaria.

REPURPOSING DRUGS FOR COVID-19

Not every attempt at repurposing a drug works as hoped, however.

At the start of the pandemic, scientists and doctors tried to find inexpensive medications to repurpose for the treatment and prevention of COVID-19. Chloroquine and hydroxychloroquine were two of those drugs. They were chosen because of possible antiviral effects documented in laboratory studies and limited anecdotal case reports from the first COVID-19 outbreaks in China. However, large clinical studies of these drugs to treat COVID-19 did not translate to any meaningful benefits. This was partly due to the serious toxic effects patients experienced before the drugs reached a high enough dose to inhibit or kill the virus.

Unfortunately, lessons from these failed attempts have not been applied to ivermectin. The false hope around using ivermectin to treat COVID-19 originated from an April 2020 laboratory study in Australia. Although the results from this study were widely circulated, I immediately had serious doubts. The concentration of ivermectin they tested was 20 to 2,000 times higher than the standard dosages used to treat human parasitic infections. Indeed, many other pharmaceutical experts confirmed my initial concerns within a month of the paper's publication. Such high concentrations of the drug could be significantly toxic.

Another commonly cited paper on ivermectin's purported effects against COVID-19 was withdrawn in July 2021 after scientists found serious flaws with the study. These flaws ranged from incorrect statistical analyses to discrepancies between collected data and published results to duplicated patient records and the inclusion of study subjects who died before even entering the study. Even more concerning, at least two other oft-cited studies have raised significant concerns about scientific fraud. ●

LATEST TRIALS CONFIRM THE BENEFITS OF MDMA – THE DRUG IN ECSTASY – FOR TREATING PTSD

By C. Michael White and Adrian V. Hernandez

For people with post-traumatic stress disorder, recalling memories of physical or sexual assault, combat or disaster-related events can induce intense anxiety or panic attacks as well as debilitating flashbacks.

In the U.S., about 7% of people suffer from PTSD and lose an average of about four working days each month as a result. Trauma-specific psychotherapy, like cognitive processing or “talk” therapy, is the cornerstone of treatment for PTSD. But for approximately half of people, these traditional approaches are ineffective at fully addressing PTSD symptoms over the long term. Antidepressant drugs are frequently used if psychotherapy fails, or in combination with it, but the effects are usually modest.

MDMA (3,4-methylenedioxymethamphetamine) is an active ingredient in the illicit street drug known as ecstasy or molly. People in dance clubs and raves use illicit MDMA because it elevates mood and energy levels, induces a feeling of bonding with others and produces a surreal psychedelic effect. These same effects have been hypothesized to support people with PTSD during psychotherapy sessions, since they can make people more willing and able to share and explore their traumatic experiences. Our new meta-analysis of clinical trials confirms the benefits of MDMA-assisted psychotherapy in the treatment of PTSD.

We are a pharmacist and physician team who investigate the benefits and harms associated with substances of abuse like bath salts, phenibut, cannabis and synthetic marijuana. Through this work we have become intrigued about the therapeutic potential for some psychedelic drugs in the treatment of myriad psychiatric disorders, from PTSD to major depression, especially MDMA and psilocybin (hallucinogenic mushrooms).

It is important to state that using ecstasy or molly products from the street would not help PTSD symptoms because the MDMA needs to be used along with carefully crafted psychotherapy in a safe, controlled environment. Ecstasy or molly products purchased illicitly never specify the exact amount of MDMA they contain, so it is impossible to dose it properly for PTSD. Taking too much MDMA or exercising while taking MDMA can cause heart attacks, strokes, seizures and arrhythmias and can damage muscles and kidneys.

WHAT IS MDMA-ASSISTED PSYCHOTHERAPY?

In an MDMA-assisted psychotherapy session, patients take MDMA as a pill upon entering a psychiatrist’s office and then work with a team of therapists who help them divulge traumatic events or discuss aspects of those events over the course of several hours. They usually have non-MDMA sessions before the first MDMA session so they know what to expect. And they have at least one non-MDMA session after each MDMA one to work through the traumatic memories that were revealed and to learn coping strategies. A standard treatment course includes two or three multihour MDMA-assisted psychotherapy sessions and several non-MDMA sessions.

The MDMA products used in these sessions are pharmaceutical grade. This means that, unlike illicitly obtained street products, they do not contain other substances of abuse, such as methamphetamine, or contaminants like heavy metals, bacteria or mold. People with hypertension or those at high risk of heart attacks, strokes or arrhythmias should not participate, because they can have unsafe elevations in blood pressure and heart rate. In addition, patients are not allowed to leave for eight hours, until the effects of MDMA have fully worn off.

ASSESSING THE EFFECTIVENESS OF MDMA-ASSISTED PSYCHOTHERAPY

In 2014, we reviewed the available animal data and the few preliminary human studies of MDMA-assisted psychotherapy, but at the time, higher-quality clinical trials had not yet been completed. But in the past few years, larger and higher-quality trials have been published, warranting an in-depth assessment.

So we recently reviewed the data comparing antidepressant use to placebos for patients with PTSD and performed a meta-analysis study of the six different clinical trials that assessed the usefulness of MDMA-assisted psychotherapy versus psychotherapy alone. All of the trials we analyzed included both men and women who had experienced a multitude of traumatic events that led to PTSD. The studies used the same points scale to determine the effectiveness of therapy, making it easier to compare data across studies. Scores above approximately 50 points mean a patient has severe PTSD, and scores reduced by more than 10 points from baseline are clinically meaningful.

We found that daily antidepressant therapy reduced PTSD by 6 to 14 points compared with the placebo, but a range of 27% to 47% of patients across the studies withdrew before the end of the trials. In contrast, MDMA-assisted psychotherapy reduced the scores by 22 points compared with those receiving psychotherapy with placebo, and patients were twice as likely to no longer meet the criteria for PTSD diagnosis by the end of the trials. In addition, only 8% of patients withdrew from MDMA-assisted psychotherapy trials. The main adverse effects included teeth grinding, jitteriness, headache and nausea. One of these MDMA trials found that participants' blood pressure and heart rate were elevated in the course of MDMA therapy, but not to a concerning extent.

For several of the trials in our meta-analysis, investigators sent a questionnaire to participants 12 months after their last MDMA session to assess the long-term impact. Overall, 86% of participants said they received substantial benefits from the combined MDMA-assisted psychotherapy. Eighty-four percent of participants reported having improved feelings of well-being, 71% had fewer nightmares, 69% had less anxiety and 66% had improved sleep. The results from across all of the studies suggested that MDMA-assisted therapy was helping to alleviate the PTSD itself, not simply suppressing symptoms.

LOOKING AHEAD

The U.S. Drug Enforcement Administration identifies MDMA and psilocybin as Schedule I controlled substances. According to the DEA, these substances have no currently accepted medical use in the U.S. and come with high abuse potential.

However, it's worth noting an important exception. Cannabidiol, or CBD, a chemical that comes from the plant *Cannabis sativa*, is classified as a Schedule I drug. But the Food and Drug Administration approved its use in 2018 for the treatment of two rare and severe childhood seizure disorders. That doesn't mean that the CBD in your lotion or seltzer has proof of benefit for most of the ills people are using it for, but its full therapeutic potential is still being explored. Given the strong consistent beneficial effects and manageable adverse events in the newer trials designed with FDA input, we suspect that MDMA-assisted psychotherapy will become an FDA-approved option for PTSD by the end of 2023. Psilocybin – commonly known as hallucinogenic mushrooms – also shows promise for treating major depression, but further research is needed.

The DEA's stringent policies made it exceptionally hard for scientists to conduct research on Schedule I drugs for decades by criminalizing the possession of the products, even in research settings. But in 2018, the agency streamlined the application process for securing a waiver for research purposes. This made it easier for researchers to conduct trials into the pharmaceutical value of psychedelic drugs. Within the next decade, this shift will almost certainly accelerate the discovery of new treatments for patients suffering from mental illness. ●

School of Law

25TH AMENDMENT: WHAT IT IS AND HOW IT WORKS, ACCORDING TO A CONSTITUTIONAL LAW EXPERT

By Jade Scipioni

FO n Thursday officials including House Speaker Nancy Pelosi, Senate Democratic Leader Chuck Schumer and Republican Rep. Adam Kinzinger called for the invocation of the 25th Amendment, Section 4, to remove President Donald Trump from office before his term ends on Jan. 20. It comes in the wake of the deadly pro-Trump riot on Wednesday in Washington, D.C.

So what is the 25th Amendment and its Section 4 provision? Here is information about the amendment and whether Section 4 could be used against Trump in this situation.

WHAT IS THE 25TH AMENDMENT?

The 25th Amendment was passed by Congress on July 6, 1965, and ratified on Feb. 10, 1967. The amendment has four sections that provide avenues by which a sitting U.S. president may be removed (temporarily or permanently) from the helm of the government if the president is not able (physically or mentally) to perform the duties of the office.

HAS IT BEEN USED BEFORE?

The 25th Amendment has been used multiple times over the years, according to Richard Kay, an expert on constitutional law and a Wallace Stevens Professor of Law Emeritus at the University of Connecticut.

Most recently, it was used in 2007 when then-President George W. Bush appointed his Vice President Dick Cheney as acting president for the time period Bush was under general anesthesia during a colonoscopy. In that instance, Section 3 was used, which allows the

president to willingly discharge his powers. However, Section 4 has never been used.

WHY SECTION 4 THIS TIME?

For the 25th Amendment, what “the drafters had in mind was the president being in some way physically disabled,” Kay tells CNBC Make It. “But they throw this one at the end (Section 4), which clearly contemplates some kind of situation where the powers that be think the president is incapable of going on and the president disagrees,” he says.

It comes into play when the vice president and certain other officials declare that the president is “unable to discharge the powers and duties of his office,” the section says, but does not require the president’s cooperation.

“It’s a way in which people who work with the president and are convinced that the president cannot effectively carry out his functions, are able to at least temporarily displace him and get the vice president to take over,” Kay says.

WHAT’S THE PROCESS?

The most important factor needed to use the 25th Amendment is having the vice president and a majority of the cabinet on board, says Kay.

“If the vice president and a majority of the cabinet send a letter to the speaker of the house and the president pro tempore of the Senate saying that, in their opinion, the president is incapable of carrying out of his functions and duties...instantly, the president ceases to have authority and the vice president takes over,” Kay says.

However, should that happen, the president can immediately follow up with his own letter to congressional leaders saying that he is indeed capable of carrying out his responsibilities.

“At that point, the president is back in charge,” Kay says.

The vice president and cabinet officers could then send a final letter to Congress disputing the president’s claim and restating that the president is unable to do to job, Kay says.

After that, according to the Constitution, it's up to the houses of Congress to decide and vote on the matter, and they have up to 21 days to do so, Kay says. During the voting process in Congress, the vice president would be in charge.

While the process sounds complicated, "these communications can go lickity split in a situation like this," Kay says.

Displacing the president would require an affirmative vote of two-thirds of the members of each House.

WILL THIS ACTUALLY HAPPEN?

The 25th Amendment, has "never been used for something like this," says Kay. "Section 4 is only about cases where there's a disagreement," Kay says. "It's contentious." It's also a political matter, he says.

Kay believes the chances of it happening are "50/50." "The key person is the vice president," Kay says. "No vice president on board, nothing is going to happen."

The White House did not immediately respond to CNBC Make It's request for comment. ●

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OP-ED: THE CRIME TRUMP COMMITTED IN STIRRING UP HIS MOB

By Richard Ashby Wilson

For years, Donald Trump has been going right up to the line of inciting violence by targeting certain minority groups and individuals with his vitriol. I have argued previously that his speech did not constitute incitement.

On Wednesday, Trump crossed the Rubicon and incited a mob to attack the U.S. Capitol as Congress was in the process of tallying the electoral college vote results. He should be criminally indicted for inciting insurrection against our democracy.

The 1st Amendment protects legitimate political debate, including speech we may find repugnant, but it

does not protect speech that incites a crowd to imminent lawless action.

Incitement law requires the presence of three elements. First, the speaker must directly advocate a crime. Trump summoned the crowd to the "Save America" rally in Washington with the words "Be there. Will be wild!" In his speech Wednesday, Trump encouraged those in attendance to march to the Capitol and "fight," which constituted an explicit call to a lawless act.

There were a number of revealing characteristics of Trump's speech. Trump said that Republicans had been too nice, like a boxer with his hands tied behind his back, which was understood by the audience that rougher tactics were needed. He said the crowd should fight "bad people" and added, "You'll never take back our country with weakness. You have to show strength, and you have to be strong."

A court can also learn about Trump's intentions by paying attention to what members of his entourage said at the same rally. Rudolph W. Giuliani urged "trial by combat" and Donald Trump Jr. warned Republican legislators, "We're coming for you."

Second, the crime being incited must be imminent, that is, about to happen. This element was fulfilled because Trump indicated that the crowd should march straightaway to the Capitol building, which they did immediately after his speech.

Finally, it must be quite likely that the crime being incited occur, and this requires an evaluation of the context of the speech. In this case, Trump is the idolized leader of a group of followers who have shown him extraordinary loyalty. Thus, his instructions and commands are very likely to be obeyed by his supporters. One Trump supporter said after invading the Capitol building, "Our president wants us here" and "We wait and take orders from our president." Trump said several times that he would march to the Capitol with them, although he returned to the White House to watch events on television.

The emotional state of the crowd also matters. Trump has been disseminating disinformation and whipping up resentment against a "stolen election" for over two months. That violence and pillage ensued after his speech, including the tragic loss of life, was eminently foreseeable.

Incitement is an inchoate crime, which means that the speech act is the crime itself and no bad consequences need ensue. However, injurious consequences did follow from Trump's exhortations and this fact helps prosecutors build a case for conviction in court.

Prosecutors could plausibly argue that had Trump not encouraged the unruly mob to march to the Capitol and "fight," the criminal acts would likely have not occurred. The evidence strongly suggests that his words were causally connected to the subsequent harms, and this could satisfy the criminal law's test of causation.

Trump could be indicted by the U.S. attorney's office for the District of Columbia. Michael Sherwin, the acting head of that office, has confirmed that his office will pursue charges wherever the evidence leads them and that he has not taken indicting Trump off the table.

It remains an open question whether a sitting president can be indicted for a crime. But it is clear that Trump could be indicted for crimes committed during his time as president after he leaves office Jan. 20.

Even if the case against Trump were to fail, it is crucial that our system of law enforcement send the unambiguous message to Trump and his followers in the final days of his presidency that further incitement of violence and sedition will result in severe consequences.

I have studied war crimes tribunals for three decades and we must acknowledge the end of American exceptionalism and learn from the history of societies that lurch from civil unrest into full-blown civil war. A failure to respond to incitement of insurrection will only embolden those who wish to destroy our democratic system.

The law of incitement was designed to protect the public from exactly this kind of politics of violence. Prosecutors should not be reluctant to apply it to anyone — including a president — who has crossed this line. ●

THE CYBERSECURITY 202: PARLER SCRAPE PUTS SOME CAPITOL RIOTERS IN LEGAL JEOPARDY

**By Tonya Riley, Technology and Cybersecurity Policy
Researcher**

Researchers and analysts say a trove of data archived from conservative-favored social media app Parler poses a real risk for those who used the platform to share their involvement in a pro-Trump mob that stormed the U.S. Capitol.

"It's mind-blowing. The potential effects go well beyond tagging who participated in the takeover of the Capitol," said Peter Singer, a strategist and senior fellow at the New America think tank.

The archive, which was scraped by a self-described hacker who goes by the Twitter handle @donk_enby, represents up to 99.9 percent of the data from Parler before Amazon's cloud services took it offline Monday, Gizmodo's Dell Cameron first reported.

Some of the rioters who attacked the Capitol last week, hoping to overturn the presidential election, had posted their plans on Parler, which was also removed from Apple and Google's app stores in the riot's aftermath.

Law enforcement officials have since used the rioters' own social media accounts to help track them down and arrest them.

That means information archived from sites like Parler, which also includes millions of posts that users deleted, could be used to implicate those who stormed the Capitol and committed possible crimes.

The underlying data attached to the posts, including location data, could be matched with information from other online forums, such as Facebook, Singer says.

With tensions over the riot so high, non-law enforcement could use the data to dox or blackmail users, Singer says.

An example of the metadata found in the archive from @donk_enby:

metadata such as <https://t.co/f5y6AzZ3km>
pic.twitter.com/95cXeCbZo6

— crash override (@donk_enby) January 10, 2021

Although @donk_enby confirmed the archive only contains information publicly available via the app, that could still include data such as phone numbers and emails. As one Twitter user pointed out, Rep. Marjorie Taylor Greene (R-Ga.), who supports the QAnon theory, had been soliciting emails and phone numbers on the app to keep in touch with supporters after Twitter and Facebook kicked President Trump off their platforms for inciting the violence.

Parler users also may have shared other identifying information in public posts.

“All the data would be fair game for law enforcement,” said Kiel Brennan-Marquez, a professor at the University of Connecticut School of Law who specializes in surveillance and data collection.

A principle under the Fourth Amendment, called the private search doctrine, allows the government to use data stemming from surveillance or intrusion by a third party — so long as law enforcement didn't coordinate with the individual. This argument has stood up in cases involving data from “hacker vigilantes,” Brennan-Marquez says.

Where law enforcement could run into issues is if the data were presented in court, which would likely require authentication of the evidence. Essentially, although the archived data from Parler might hasten law enforcement efforts, officials probably would still have to confirm its authenticity through a subpoena of the original posts from Amazon Web Services or other means.

Although it wasn't archived, Parler also collected Social Security numbers, phone manufacturer and carrier, and mobile activities. That's a treasure trove of data should law enforcement choose to subpoena it.

There's also a chance such a high-profile case could become a flash point in arguments the private search doctrine has given law enforcement too much authority, as Brennan-Marquez and other legal experts have warned.

A map of the Parler post locations in the U.S. based on the archive data by coder Kyle McDonald:

Parler's failure to safeguard user content and metadata from scraping challenges its funders' claims to be a “beacon” for privacy.

“It's one thing to have the intention of privacy and it's another to be able to deliver it in a meaningful way,” security researcher Troy Hunt told my colleagues Rachel Lerman and Nitasha Tiku. He pointed out that both Facebook and Twitter have controls in place to prevent the same kind of scraping.

It's unclear why Parler would have collected such extensive data on users. The company was launched by an investment from the billionaire Republican megadonor Rebekah Mercer, who with her father helped bankroll Trump and Cambridge Analytica, the firm behind the notorious Facebook data-harvesting project.

As trusted enterprise services, including security firms, drop right-wing apps for hosting content inciting violence, they could become even more insecure.

THE KEYS

The Treasury Department sanctioned Russia-linked trolls who tried to spread unfounded corruption allegations about Biden.

Several were involved with a campaign by Trump's personal lawyer Rudolph W. Giuliani to damage President-elect Joe Biden, officials said, Ellen Nakashima and David L. Stern report.

Andrii Telizhenko worked with Giuliani to spread anti-Biden information with Republican lawmakers. The allegations of corruption resulted in a Senate probe that fizzled out with any real evidence.

“By imposing sanctions on Telizhenko, the Trump administration confirms that Senate Republicans' year-long investigation was based on Russian disinformation,” the Senate Finance Committee's ranking Democrat, Sen. Ron Wyden (Ore.), said in a statement.

Giuliani's lawyer, Robert J. Costello, called the Treasury Department's statement an attempt to “paint guilt on people by association.”

Biden will nominate William J. Burns as the next director of the CIA as tensions with Russia over hacking heat up.

Burns was most recently the deputy secretary of state under President Barack Obama before retiring in 2014, Shane Harris reports.

Burns, who has more than three decades worth of foreign service experience and served as a U.S. ambassador to Russia, would be taking over as the United States deals with a massive hack of multiple government agencies by Russia. The CIA, alongside the intelligence community, has also had to contend with election interference from Russia, China and Iran.

“Bill Burns is an exemplary diplomat with decades of experience on the world stage keeping our people and our country safe and secure,” Biden said in a statement. “He shares my profound belief that intelligence must be apolitical and that the dedicated intelligence professionals serving our nation deserve our gratitude and respect.”

An angry State Department employee — not a hacker — appears to be behind an edit saying Trump's term is over.

The changes to the State Department's biographical pages for the president and Vice President Pence were the work of an angry employee not a hacker, Christopher Miller at BuzzFeed reported. Both pages were removed by 4 p.m.

It's a “closed system” that is “nearly impossible to hack,” one diplomat familiar with the situation told BuzzFeed. “It's 100% not a hack.”

Secretary of State Mike Pompeo has ordered an internal investigation of the matter, a diplomat with knowledge of the situation told BuzzFeed.

Acting homeland security secretary Chad Wolf resigned Monday. Lawmakers are questioning his timing.

Chad Wolf, acting Secretary of Homeland Security, appears before the Senate Homeland Security and Governmental Affairs Committee. (Toni Sandys/The Washington Post/POOL)

His sudden resignation comes just little over a week before the agency is set to oversee the presidential inauguration, where pro-Trump militants plan to stage

gatherings similar to last week's deadly mob, Nick Miroff and Carol D. Leonnig report.

Lawmakers have blasted Wolf and DHS for not anticipating the threats posed by last week's mob and have called for hearings on the subject. Now lawmakers are questioning Wolf's early resignation before the next big potential threat.

“He has chosen to resign during a time of national crisis and when domestic terrorists may be planning additional attacks on our government,” Rep. Bennie Thompson (D-Miss.), chairman of the House Homeland Security Committee, said in a statement. “Unlike others, he is apparently not leaving the Trump Administration on principle.”

Wolf served in the acting role for more than a year without congressional confirmation. ●

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SEVERAL CAPITOL RIOTERS ARE BLAMING TRUMP'S RHETORIC. WHAT'S IN IT FOR THEM?

Those accused of crimes have cited Trump before — apparently hoping to reduce their own legal liability. But experts say it's unlikely to matter much.

By Aaron Blake

Former president Donald Trump's impeachment defense has officially begun, with his lawyers filing a brief Tuesday responding to the charges against him. The brief does little to argue that Trump didn't actually incite the rioters who stormed the Capitol on Jan. 6. Instead, it focuses on the alleged unconstitutionality of the proceedings and broadly on Trump's right to free speech.

But as the trial begins next week, Trump's culpability for the riots will be at issue. And on that count, one piece of evidence looms large: the number of those who

invaded the Capitol who explicitly cited Trump's encouragement.

As The Washington Post and other news outlets have reported, several of the rioters who have been arrested pointed to perceived invitations from Trump. Up to half a dozen have now cited Trump's encouragement in court, according to Reuters.

The lawyer for a man seen on video striking police officers' protective shields has said that "the nature and circumstances of this offense must be viewed through the lens of an event inspired by the president of the United States." Another lawyer said it was "regrettable" that his client, Riley June Williams, "took the president's bait and went inside the Capitol." Another participant who has cited Trump's encouragement, Jacob Chansley, the "QAnon Shaman," has even volunteered to testify at Trump's impeachment trial.

But how significant is that? And can it be taken at face value?

These participants may have a good reason to cite Trump: to shift blame away from themselves. But according to legal experts, this strategy may not carry much or any legal benefit for them.

"Seeking to deflect blame from defendants by saying that they received instructions from then-President Trump is not likely to sway a criminal court to acquit them," said Richard Ashby Wilson, a law professor at the University of Connecticut.

Wilson added that blame could figure into claims against Trump, particularly in a legal setting if Trump were indicted.

"If his defense counsel claims that he didn't mean literally to fight physically when he said 'fight,' then that claim would be belied by all the members of his audience who understood his words to mean go and physically fight," Wilson said.

Jens David Ohlin of Cornell University Law School also saw very limited benefit from blaming Trump.

"It doesn't line up with any recognized legal defense," Ohlin said. "They aren't claiming self-defense or insanity or necessity or any other established doctrine. The fact that Trump incited the riot doesn't extinguish the criminal responsibility of the rioters at all. That's frequently the case in the criminal law: More than one

person can be responsible, in different ways, for a criminal event."

Leslie Jacobs, a constitutional law professor at Pacific University, also suggested that such claims would do nothing to reduce participants' legal liability.

"There was no duress or undue influence. No heat of passion," Jacobs said, adding: "The usual rule is that people who do conduct are liable according to the law for it, and speakers may speak so long as they do not engage in conduct."

At least one expert, though, discerned a possible benefit for the accused. Steven Morrison of the University of North Dakota Law School said that, although such a claim may not absolve someone of guilt, it could conceivably factor into other things, including their ultimate sentence.

"If they truly believed they were following the president's orders, this could mitigate their ultimate sentence by showing them to be less culpable — all other things being equal," Morrison said.

He said that participants in the riot could also argue that they "were acting under color of official authority" — i.e. taking actions in good faith based on a belief about their mandate — or claim that they were literally acting on Trump's official orders, the latter of which would be extremely difficult to prove. If it were proven, Morrison said, it would "bode very poorly for President Trump's own criminal exposure."

The Post's Devlin Barrett outlines the potential charges President Trump and his legal team may face for inciting a mob to breach the U.S. Capitol on Jan. 6. (The Washington Post)

Morrison said believing they were acting on Trump's orders is probably the only argument that would be likely to make a difference.

But, notably, the claims being made against Trump are from people who stormed the Capitol on his behalf. Making such claims is hardly a win-win, given how much it could damage the president they were there to support — and how it could inject them into his impeachment trial. (Chansley's lawyer, who has been the most active in citing Trump as a motivational factor for his client's actions, has said the client thinks Trump betrayed him.)

THE LANDMARK KLAN FREE-SPEECH CASE BEHIND TRUMP'S IMPEACHMENT DEFENSE

By Michael S. Rosenwald

In the summer of 1964, not long after President Lyndon B. Johnson signed the landmark Civil Rights Act, a Ku Klux Klan member named Clarence Brandenburg invited a TV news reporter to a rally near Cincinnati.

Brandenburg, a television repairman, was wearing a hood, as were a dozen other Klan members who gathered. Some had guns. They burned a cross while spewing racist and antisemitic commentary. Brandenburg also made a threat about seeking vengeance.

"We're not a revengent organization," he said, inventing a new word. "But if our president, our Congress, our Supreme Court continues to suppress the White, Caucasian race, it's possible that there might have to be some revenge taken."

What happened next has shaped First Amendment law for more than 50 years, laying down a legal doctrine at the center of former president Donald Trump's Senate impeachment trial.

Brandenburg was arrested under an Ohio law that prohibited advocating violence to force political change. After being convicted and sentenced to a year in jail, he sued, alleging his free speech rights had been violated.

The case made it all the way to the Supreme Court, which ruled in the Klan member's favor in 1969 and established a test to determine whether speech such as Brandenburg's could be prohibited. Speech that is "directed at inciting or producing imminent lawless action" or "likely to incite or produce such action" was not protected by the First Amendment, the court said.

Though Trump's impeachment is not a criminal trial, his lawyers in their legal briefs referenced Brandenburg v. Ohio, arguing that Trump didn't direct his supporters to attack the Capitol. House managers prosecuting the

This is hardly the first time people accused of crimes have cited Trump. As of May, ABC News had found 41 cases in which defendants accused of assault, threats or other violence had suggested that their actions were on behalf of the then-president, including 10 in which Trump was cited in court.

The lawyer for a Montana man, Curt Brockway, who was charged with assaulting and fracturing the skull of a child who didn't remove his hat for the national anthem, claimed that he was acting on Trump's perceived orders. "Trump never necessarily says go hurt somebody, but the message is absolutely clear," said the man's lawyer. "I am certain of the fact that [my client] was doing what he believed he was told to do, essentially, by the president." Brockway eventually pleaded guilty and received a 10-year suspended sentence.

It also happened after Trump supporter Cesar Sayoc was charged with sending pipe bombs to prominent Democrats and members of the media. Sayoc's lawyers argued for a lenient sentence by saying their mentally ill client had taken Trump's claims about dangerous Democrats too literally.

"In his statements, Trump specifically blamed many of the individuals whom Mr. Sayoc ultimately targeted with his packages," the lawyers said. "A rational observer may have brushed off Trump's tweets as hyperbole, but Mr. Sayoc took them to heart."

But the argument didn't pass muster with U.S. District Judge Jed Rakoff, who said he "wasn't particularly impressed" by the effort to cite the influence of Trump and others, calling that a "sideshow." Sayoc received 20 years in prison.

When Sayoc's team put forward that argument in 2019, former assistant U.S. attorney Mimi Rocah wrote an opinion piece for NBC News titled, "Pipe-bomber Cesar Sayoc's lawyers named Trump in their defense. They won't be the only ones."

And here we are today. Expect to hear plenty more about what these people have had to say — and what it means — when Trump's impeachment trial starts next week. ●

case took the opposite view on Brandenburg and Trump, saying he crossed the line set up by the Supreme Court.

On Wednesday, the second day of the impeachment trial, Rep. Jamie B. Raskin (D-Md.), the lead House manager, called Trump the “inciter in chief” and argued that the ex-president had “no credible” First Amendment defense for urging the mob to attack the Capitol.

Then, on Friday, Trump attorney David Schoen invoked Brandenburg in accusing House managers of selectively editing video of Trump’s Jan. 6 speech to make it seem like the president was inciting the crowd.

Constitutional-law scholars have been debating the issue for weeks in dueling op-eds.

Richard A. Wilson, a University of Connecticut law professor and co-author of a recent journal article about incitement in the age of populism, said the revival of the Klan case is a broader reminder of how free speech was extremely limited until the civil rights movement.

“We like to tell ourselves as Americans we’ve had all these great First Amendment rights for the entire period of our republic, but it’s simply not true,” Wilson said. “We were very repressive of speech until the end of the 1960s, and it was civil rights that opened the door.”

And that meant protecting speech that many would deem deplorable, including Brandenburg’s.

In his speech at the Klan rally, Brandenburg — using words too ugly to publish then or now — demanded that Black people be deported to Africa and Jews to Israel.

He is lucky his wish didn’t come true. Brandenburg’s legal team from the American Civil Liberties Union included Allen Brown, a Jewish man, and Eleanor Holmes Norton, an African American woman.

Norton, now 83, is the District’s longtime delegate in Congress. “I certainly disagreed with everything he said,” Norton said in an interview. “He called African Americans all kinds of pejorative names, terrible things. But for me, it was an easy case. It’s just the kind of case that you should look at to test whether you are for free speech or not.”

Told that Trump’s lawyers had referenced Brandenburg v. Ohio in their legal briefs, Norton said, “I don’t blame them.”

But she thinks Trump’s actions differ from Brandenburg’s. The Klan leader’s speech, Norton said, did not seem aimed at “imminent lawless action,” as the Supreme Court’s test required. She thinks Trump did cross that line.

“His lawyers need to defend him with speech because there’s no other way to defend it,” she said.

It’s unclear what became of Brandenburg, who died in 1986. News reports indicate he was arrested years after his Supreme Court win for harassing a Jewish neighbor.

But Norton remembers how thankful Brandenburg was for the Jewish and African American lawyers who defended his right to free speech, ugly or not.

“He was so appreciative of the argument that had been made,” Norton said. “I guess he forgot his racism for a moment.” ●

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OP-ED: WILL THE SUPREME COURT STAND UP FOR THE MEAGER RIGHTS OF FARMWORKERS?

By Bethany Berger

On Monday, the Supreme Court will hear a case about farmworker rights that may transform the constitutional meaning of property.

If you’re eating your fruits and vegetables, you can thank a migrant farmworker. Long after the campaigns for farmworker rights led by Cesar Chavez and Dolores Huerta in the 1970s, the workers who pick the nation’s produce remain incredibly vulnerable.

Most migrant farmworkers are from rural Mexico, almost half are undocumented, and increasing numbers

are Indigenous people fluent in neither Spanish nor English. Migrant workers often spend only a few months or weeks at a particular farm, living either in housing controlled by growers or labor contractors, homes many miles from their workplaces, or in expensive, overcrowded rentals. Very few have smartphones or home internet, and many cannot read in any language. COVID-19 ripped through farmworker communities, with some employers firing workers who sought protections from the disease.

To protect this vulnerable group, California law gives unions a limited right to enter growing sites. The unions must give notice to the growers first, can only enter for up to four 30-day periods a year, and can only speak to workers during the hour before work, the hour after and during the lunch break. California adopted the regulation in the 1970s, but reaffirmed it in 2015 after finding that farms were still the only effective places to reach farmworkers.

In 2016, two California growers sued the state, arguing that the regulation unconstitutionally “takes” their property because it prevents them from excluding the unions from their land. The 9th Circuit Court of Appeals rejected the claim, but the Supreme Court granted review of the case, *Cedar Point Nursery vs. Hassid*.

If the Supreme Court rules for the growers, it threatens not just the California regulation but hundreds of federal, state and local laws that allow entries to property to protect health and safety. Inspections of meatpacking and other food processing facilities; of factories making airplanes, pharmaceuticals or other products; of mines and other workplaces — all would be “takings” requiring compensation under the growers’ theory.

And that may be the point. The growers’ attorneys, the Pacific Legal Foundation, and conservative organizations like the Cato Institute and Institute for Justice that have filed amicus briefs in support of the growers are dedicated to limiting government regulation. All also receive substantial funding from conservative business interests — the same groups that funded efforts to appoint conservative justices to the Supreme Court.

The existing legal precedent does not support the growers. Past Supreme Court decisions have rejected challenges based on a “takings” theory when there were far more significant limitations on owners’

exclusion rights. Those earlier decisions upheld rent control laws that prevent eviction, mortgage moratoriums that delay foreclosure and state rules that allow petitioners to gather signatures at malls.

Permanent physical occupations of land are always takings, but the entries here are far from permanent. Even if organizers were at a farm site for the maximum time allowed, that would make up just 4% of the hours in a year. Temporary physical invasions are also takings if they substantially harm owners’ economic interests, but the growers presented no evidence at all of any negative economic impact on them.

Some conservative members of the court believe that constitutional decisions should follow the intent of the Constitution’s drafters, but that doesn’t help the growers either. As I wrote in an amicus brief on behalf of legal historians in the case, when the Constitution was drafted and adopted, colonies and states recognized many rights for officials and the public to temporarily enter private property.

These include Massachusetts’ original Body of Liberties allowing the public to pass through “any mans propriety” to reach the great ponds of the colony, and early state laws allowing officials to enter ships to inspect shipments of “pot and pearl ash” or enter land to conduct surveys for roads. To rule that California’s regulation is a taking, the Supreme Court would have to adopt an understanding of property that would have been wholly foreign to the founding generation.

The decision in *Cedar Point Nursery* will be a test of the Supreme Court and its three new justices. Will they decide in favor of past precedent and the understandings of the founding generation? Or will they create a radical new understanding of property owner and government rights? The answer will say much not just about the rights of migrant farmworkers but the future of the reconfigured Supreme Court. ●

HOW 3M EARPLUG LITIGATION GOT TO BE BIGGEST MDL IN HISTORY

By Brendan Pierson

Since Congress created the multidistrict litigation system in 1968, no MDL has taken off like the one over 3M Co's military-issue earplugs.

With close to 230,000 actions pending in Pensacola, Florida federal court, it had grown to be the largest MDL in history, surpassing even the mammoth asbestos MDL, in just two years. It dwarfs the next largest MDL, over Johnson & Johnson's talc products, which has about 30,000 cases, and accounts for almost all of the massive jump in cumulative MDL cases, from 750,000 to over 1 million, between 2020 and 2021.

The plaintiffs, U.S. military veterans and servicemembers, allege that they suffered hearing damage as a result of using 3M's Combat Arms Earplugs, Version 2 (CAEv2), which they say were defective. 3M in 2018 paid \$9.1 million to settle claims by the U.S. government that it concealed defects in the plugs, but did not admit liability.

Multiple factors likely contributed to the MDL's rapid growth, experts say.

One is that military veterans are likely to be attuned to existing networks and organizations, making it easier for word to spread, said Elizabeth Burch of the University of Georgia School of Law, who has studied trends in mass tort litigation extensively.

"It's obviously helpful when the organization predates the litigation," she said. "Just the fact that these are military people, that they have that network in place."

A related factor is that it is very easy to ascertain who potential plaintiffs are, said Alexandra Lahav of the University of Connecticut Law School.

"If you had earplugs and you were in the military, that's a thing you would know about yourself," she said. In other mass torts, such as those over the painkiller Vioxx or Bayer's weedkiller Roundup, people are much less

likely to remember whether they used the product, or how much, at some point in the past, she said.

The 3M earplugs were widely used in both Afghanistan and Iraq between 2001 and 2015. More than 2 million servicemembers were deployed during that time, and hearing damage is the single leading cause of disability reported to the Department of Veterans' Affairs.

"We're dealing with a relatively standardized product widely distributed through a military procurement process," said Adam Zimmerman, a professor at Loyola Law School. "The defense department and the military, it's so huge. When something goes wrong, lots of people are impacted."

Another possible factor is the relative scarcity of parallel litigation in state courts. While more than 190,000 actions were consolidated in the asbestos MDL, a much larger number were filed in various state courts, since plaintiffs were often able to sue defendants in their own states and avoid federal jurisdiction.

That is not the case for 3M's earplugs, where the company is the only defendant. A few hundred cases have been brought in state courts in Minnesota, where the company is based, but the rest are funneled into the MDL.

Whether the MDL's size will work in favor of one side or another is not clear. The first test - a bellwether trial featuring three army veterans - is currently underway.

Traditionally, defendants have favored MDLs as an opportunity to dispose of large numbers of cases by winning favorable pretrial rulings, but Lahav said that may be changing as mass torts get more public attention.

"It's beneficial to plaintiffs because it looks very large," she said, potentially pushing shareholders to call for a settlement. "A consolidation kind of raises the profile of a litigation, makes it loom large, and that creates pressure on the defendant."

On the other hand, she said, having actions in multiple venues gives plaintiffs more chances to win.

"It could benefit either side," she said. "It sort of depends how things play out and how the judge rules."

The case is *In re 3M Combat Arms Earplug Products Liability Litigation*, U.S. District Court for the Northern District of Florida, No. 19-md-2885.

For the plaintiffs: Bryan Aylstock of Aylstock, Witkin, Kreis & Overholtz, Shelley Hutson of Clark, Love & Hutson and Christopher Seeger of Seeger Weiss

For 3M: Mike Brock of Kirkland & Ellis ●

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BURNED IN TOBACCO DEAL, CITIES IN DRUG FIGHT TARGET MCKINSEY

By Jef Feeley

U.S. cities and counties are increasingly at odds with their own state governments over how to divvy up \$641.5 million that consulting firm McKinsey & Co. has offered to settle its liability for work with the opioid industry.

In the past two months, McKinsey reached final agreements with all 50 states to resolve lawsuits claiming it helped boost sales of the addictive drugs. But since then, more than 20 cities, counties and Native American tribes have sued the consultant, hoping for their own payouts. Local governments in New York even sought to block the state's pact with McKinsey because it would harm their separate suits against the firm.

McKinsey says almost all the states agreed that the deal they signed covers any other claims, setting up a legal fight between the company and local governments pressing ahead with their cases. At the heart of the dispute is who decides the fate of money intended to combat addiction and crime linked to the U.S. opioid crisis that's killed hundreds of thousands of people.

"There's going to be a lot of litigation," said Alexandra Lahav, a University of Connecticut law professor who specializes in mass tort cases. "Every state takes its own view of the powers an attorney general has to resolve claims on behalf of local governments within the state's borders."

The outcome could have wider implications. Thousands of cities and counties are pursuing opioid lawsuits against drug makers like Johnson & Johnson and

distributors like McKesson Corp. While lawyers for local governments are participating in settlement discussions with those defendants, the widening rift between states and municipalities could complicate future talks with companies that remain holdouts -- including pharmacy owners such as Walmart Inc., CVS Health Corp. and Rite Aid Corp.

'A PITTANCE'

Local officials like Thomas Haine, the state prosecutor in Madison County, Illinois, want to avoid opioid litigation becoming a repeat of the 1998 settlement that ended smoking-related litigation, where much of the \$246 billion that tobacco makers paid ended up in state general funds. His county of 263,000 people outside St. Louis sued McKinsey in February, just days before Illinois agreed to accept \$19.8 million from the firm.

That amount is "a pittance when you quantify the damages caused by their actions," Haine said in an interview. "I felt we owed it to the taxpayers of Madison County, who have shouldered a heavy burden in dealing with the opioid crisis, to seek recovery from every party potentially at fault."

A growing number of local officials are also pursuing separate claims against McKinsey, including King County, Washington; Montgomery County, Ohio; Pembroke Pines, Florida; Green County, Kentucky; and Mingo County, West Virginia -- one of the states hit hardest by the opioid epidemic.

McKinsey says its deal with the states means no additional payments or settlements are necessary.

"The state attorneys general are the chief law enforcement officers for their states and are in charge of managing investigations and settlements such as this one," D.J. Carella, a McKinsey spokesman, said in an email. "The funds provided by this settlement will be used by the state governments to support communities throughout those states."

The authority of the state to act on behalf of municipalities stems from a legal doctrine known as *parens patriae* which grants power to the state to protect its citizens, said Michelle Richards, a law professor at the University of Detroit Mercy in Michigan. That could mean separate claims for opioid cash by cities and counties may have a hard time surviving in court, she said.

Only two state attorneys general, Washington's Robert Ferguson and West Virginia's Patrick Morrisey, insisted that their deals with the consulting company wouldn't prohibit local officials from bringing their own lawsuits, according to McKinsey.

In New York, where Attorney General Letitia James accepted \$32 million of the McKinsey accord, the question of whether the agreement prevents local officials from suing came up court hearings in February and March involving McKinsey, the state and municipalities.

According to a transcripts from the hearings, lawyers for the counties wanted the same assurances as Washington and West Virginia that they could pursue their own claims. David Nachman, a lawyer for New York, told the judge the deal did not block local claims, "but we also understood that McKinsey" may argue that it does. "We have not in any way interfered with the Counties' rights."

Hunter Shkolnik, a lawyer for several New York counties with opioid suits, said in an email that "McKinsey is flat wrong to believe the \$641 million they paid the states wipes out all their opioid liability."

'TURBOCHARGE' SALES

Massachusetts in 2019 claimed McKinsey advised drug maker Purdue Pharma LP how to "turbocharge" sales of its OxyContin painkiller at a time when the legitimate market for the highly addictive pills was shrinking. McKinsey worked for other opioid makers, including Johnson & Johnson and Endo International Plc, though it has since said it would no longer advise companies that produce pain pills.

It's unlikely many opioid companies will take as hard a line as McKinsey on negotiating opioid deals, especially if they want universal settlements, said Eli Savit, a University of Michigan law professor who has written about the conflicting rights of states and local government litigation. The strategy isn't attractive because it "won't give them any finality" as cities and counties pursue their own lawsuits, Savit said.

"Chances are, McKinsey's legal strategists know they aren't going to knock out all the city and county opioid cases," said Carl Tobias, a University of Richmond law professor who specializes in mass-tort cases. "But by adopting this tactic, they may take out some of them."

Some states already have worked out agreements with municipalities about how to allocate opioid settlements. In Ohio, all recoveries will be turned over to a foundation, which will distribute funds based on the per capita number of opioid deaths in an area. Similar plans are in place for other states, including Texas and New Hampshire.

They may soon have billions to distribute. J&J and drug distributors McKesson Corp., Cardinal Health Inc. and AmerisourceBergen Corp. are offering to pay a total of \$26 billion to settle their liability -- including with cities and counties -- though the deal hasn't been finalized.

Cases filed by Native Americans tribes, considered the legal equivalent of states, pose an greater risk for McKinsey and others hoping to only negotiate with state attorneys general, Richards said. Among those with new suits against the consulting company are the Kenaitze tribe in Alaska and the Cherokee Nation in Oklahoma.

"The states have been quite dismissive of the tribes' efforts to position themselves to get a fair share of these settlements," giving them more incentive to push separate claims after the opioid epidemic caused disproportionate suffering in their communities, said Lloyd Miller, a lawyer for the groups.

"Everyone involved in this opioid mess needs to be held accountable for their part in the profiteering, strategizing and conspiracy in creating and sustaining this crisis," said Dr. Aaron Payment, chairman of the Michigan-based Sault Ste. Marie Tribe of Chippewa Indians. ●

JAPAN PROPOSES FOUR-DAY WORKWEEK AS IDEA GAINS PURCHASE AMID PANDEMIC

By Sammy Westfall

Japan, known for its rigid work culture, is entertaining changes to the standard workweek few would have predicted even several years ago.

The country's annual economic policy guidelines, released this month, unveiled plans to push employers to adopt four-day workweeks, marking official acceptance of a once-fringe approach that has gained increasing purchase internationally amid workplace changes wrought by the coronavirus pandemic.

The recommendation that companies adopt an optional shorter workweek is meant to support employees who want to further their education, take care of family members or simply to go out, spend money and even meet others, as Japan's population ages and shrinks.

In proposing four-day weeks, Japan joined Spain, which is launching a three-year, nationwide, voluntary 32-hour week experiment, and several other countries have been mulling the prospect.

New Zealand's and Finland's prime ministers have floated the idea of a four-day workweek. Britain's Labour Party in 2019 campaigned on the idea that workweeks would be shortened in the next decade.

A number of employers have also begun to move in that direction. On Tuesday, Kickstarter announced it would reduce employees' hours without reducing pay next year, the Atlantic reported.

Microsoft in Japan instituted a temporary three-day weekend in August 2019 — which resulted in a reported 40 percent increase in productivity, according to the company, and reduced electricity consumption and paper printing.

"A five-day workweek was never a given," Robert Bird, a professor of business law at the University of Connecticut, told The Washington Post, adding that

unions fought hard to scrap the six-day workweek norm in the early 1900s. "A five-day workweek was never something that was unchangeable or immutable."

A four-day workweek movement made headway in the 1970s, and some believed its adoption was inevitable, before momentum dissipated.

But five decades later, in the face of a labor shortage, a massive bout of quitting, as well as more than a year of work-from-home and increased flexibility for many workers, Bird, like other experts around the world, said he thinks there is a chance for the idea to stick.

"Younger people are demanding more out of their work environment than just a paycheck," he said. "They want to work with someone who believes in their values — and the expression of a four-day workweek sends a signal that the company cares about work-life balance in a significant and meaningful way."

Japan's strong private-public coordination and group-focused culture make the top-down proposal more likely to succeed, he said. But it is a different story in the United States, where such a change would be unlikely unless workers "speak and use their bargaining power."

Peter Cheese, who heads the British government's Flexible Working Task Force, called the pandemic a "generational opportunity" to institutionalize more flexible work, Politico reported.

The idea of a four-day workweek "is really rising in prominence, momentum and popularity, not just in the U.K. but all across the world right now, as we're opening our eyes to a better future of work — and that's in everybody's interest," Joe Ryle, an officer for the U. K.-based 4 Day Week Campaign, told The Post.

Most countries, however, including Japan, are still some ways off from so drastic a change. Many Japanese employers are concerned that productivity would lag, and many workers fear pay cuts, the Japan Times reported. ●

BIDEN IS TARGETING NON-COMPETE AGREEMENTS WITH AN EXECUTIVE ORDER. HERE'S WHAT THAT COULD MEAN FOR THE RESTAURANT INDUSTRY.

BY Jessica Fu

Workers of all stripes—from brewers to chefs to fast-food employees—are subject to non-compete agreements, which can restrict their ability to find new jobs or start their own businesses.

The Biden administration is cracking down on non-compete clauses—a common hiring mechanism that can restrict workers' ability to find new jobs or start their own businesses.

On Friday, the President signed an executive order calling on the Federal Trade Commission (FTC), the agency that oversees consumer protection and antitrust, to “ban or limit” the use of these stipulations in employment contracts. The order was part of a broader initiative meant to promote competition in the U.S. economy, which also included funding to reduce concentration in the food supply chain among other aims.

“Competition in labor markets empowers workers to demand higher wages and greater dignity and respect in the workplace,” the White House wrote in a press release. “One way companies stifle competition is with non-compete clauses.”

This development could have particularly big ramifications in the restaurant industry, where non-compete restrictions have been imposed on workers in various capacities—from brewers to chefs to fast-food employees—in the past few years. While the prevalence of the practice may vary by region, one labor study published in April estimated that around one in six people working in food preparation or service jobs was

bound by a non-compete agreement, according to a survey of nearly 67,000 workers.

“You would have to either leave the area or sit out the market for whatever the period of your non-compete is and then re-enter.”

Non-compete provisions typically prevent employees from leaving a job to work for a competitor or start a competing business within a certain region or time frame. Some businesses say that they depend on non-compete agreements as a form of protection for proprietary information, but they can also limit workers' options when looking for future work, particularly in low-wage industries like food service and hospitality.

“If you work at a restaurant, and you have a noncompete, and you want to get hired by another restaurant down the street, or you want to start a restaurant, this non-compete would prevent you from doing this immediately,” said Evan Starr, an associate professor at the University of Maryland's business school and author of the April study. “You would have to either leave the area or sit out the market for whatever the period of your non-compete is and then re-enter. The key idea is that it's going to [get] workers to stay longer, stunt their mobility, prohibit them from taking better jobs in their chosen field, and reduce entrepreneurship.”

For example, readers may recall the infamous Jimmy John's non-compete controversy of 2014. According to a Huffington Post report, the fast food chain required its employees and delivery workers to sign contracts agreeing not to work at any restaurant where sandwiches comprised 10 percent or more of total revenue (that's right—not just sandwich businesses but any store that sold sandwiches or wraps) within three miles of a Jimmy John's location for two years after leaving the company. Following an investigation from the New York attorney general's office, Jimmy John's dropped the clause in late 2016.

Other notable cases include a 2018 lawsuit filed by a craft brewery against a former employee, who quit to take on a similar role at another company 100 miles away, as well as multiple instances of chefs being forced to wait out lengthy noncompete periods before they could resume working at restaurants.

“If your employer knows that you can go around the corner and get a better job or better wages, then they have to pay you better, they have to treat you better.”

To some labor researchers, these dynamics may not just reduce job options—but could also compel workers to put up with poor working conditions.

“For non-unionized workers, which are the vast majority of workers in this sector, the only source of economic leverage they have with respect to their employers is their implicit ability to quit their job and go find a better one,” said Heidi Shierholz, an economist at the Economic Policy Institute and former chief economist at the Department of Labor under Obama. “If your employer knows that you can go around the corner and get a better job or better wages, then they have to pay you better, they have to treat you better. That’s the source of any leverage that a worker has. A non-compete agreement is in no uncertain terms just employers taking that away.”

Although some states have local legislation limiting the use of non-compete agreements, labor researchers point out that a federal ban would give workers across the country consistent protections. Additionally, FTC oversight could embolden employees who find themselves faced with non-compete provisions in job contracts, but have little leverage to push back.

“Laws to restrict non-compete agreements are less effective if they depend on the individual worker to enforce them, because workers—especially low-wage workers—are less likely to risk being sued or hiring a lawyer,” said Sachin Pandya, a professor at the University of Connecticut who specializes in employment law. “A government agency like the FTC has more power and resources to identify and sue employers who use illegal non-compete clauses, and thereby better deter other employers from using them, too.”

“For non-unionized workers, the only source of economic leverage they have with respect to their employers is their implicit ability to quit their job and go find a better one.”

Non-compete agreements are commonly confused with no-poach agreements, a slightly distinct, yet similarly contentious business practice in the restaurant industry. Non-compete agreements are terms that workers sign with employers; no-poach agreements are signed

between franchises of a fast-food chain agreeing not to hire each others’ staff. Both can effectively lock workers into low-paying jobs, which is why they’ve been the target of policymakers and labor advocates in recent years. Last summer, following an investigation into no-poach agreements in Washington state, numerous national chains agreed to stop the practice.

Now, the question for observers is whether the Biden administration’s executive order will enable the FTC to do the same for non-competes. As of right now, how exactly the agency determines to restrict non-compete agreements is up in the air.

“The devil’s in the details,” Shierholz said. “How this actually plays out will determine how effective it is.” ●

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TRUMP FACES LEGAL HURDLES IN KEEPING TAX RETURNS PRIVATE

By Harper Neidig

Former President Trump is facing significant legal hurdles in his ongoing effort to keep his tax returns away from Congress now that he’s a private citizen and the Justice Department is no longer fighting the oversight efforts.

His lawyers are trying to block the Biden administration from handing the documents to the House Ways and Means Committee, arguing that lawmakers have no legitimate purpose for seeking them.

A federal judge on Monday set a hearing in the case for November, further prolonging the congressional investigations into the former president’s still-undisclosed finances as the Trump Organization and one of its top executives face criminal charges in New York.

The committee first requested Trump’s tax returns in 2019, citing a federal law that requires the IRS to hand over private tax records to certain congressional panels. But the Justice Department under the Trump

administration advised the Treasury Department to refuse to comply, prompting House leaders to sue to enforce its demand in court.

In July, the Biden administration announced a reversal in its legal position, saying the Treasury Department should hand over the tax returns after the committee renewed its request in June.

“Applying the proper degree of deference due the Committee, we believe that there is ample basis to conclude that its June 2021 Request for former President Trump’s tax information would further the Committee’s principal stated objective of assessing the IRS’s presidential audit program—a plainly legitimate area for congressional inquiry and possible legislation,” the Justice Department’s Office of Legal Counsel (OLC) said in a memo. “The Chairman’s additional stated objectives for reviewing that tax information are also legitimate, and the Committee has authority to seek the records for those reasons as well.”

But the administration’s reversal did not put an end to the case. Trump quickly sued to block the disclosure, with his lawyers pointing to Democrats’ political attacks as evidence that the committee’s motives for obtaining his returns have little to do with legislation, but the effort is rather intended “to expose the private tax information of one individual — President Trump — for political gain.”

“The requests are tailored to, and in practical operation will affect, only President Trump,” the former president’s lawyers said in a court filing last week. “The requests single out President Trump because he is a Republican and a political opponent. They were made to retaliate against President Trump because of his policy positions, his political beliefs, and his protected speech, including the positions he took during the 2016 and 2020 campaigns.”

But legal experts say that Trump faces an uphill battle in keeping his returns out of the hands of congressional Democrats now that he is a private citizen and government lawyers have sided against him.

“Not having that ally is going to make it harder for Trump,” said Jonathan David Shaub, an assistant law professor at the University of Kentucky and a former OLC attorney.

Shaub added that while Trump’s lawyers are seeking to undermine the committee’s rationale for seeking the tax returns, judges typically don’t second-guess lawmakers’ intent.

“Courts are traditionally very deferential to what the committee says it’s doing,” he said. “And they accept that and then they’ll test whether that’s a facially valid request or not, given the committee’s jurisdiction, and any kind of separation-of-powers principles that Trump’s attorneys raise.”

Richard Pomp, a tax law professor at the University of Connecticut, says that ascribing the committee’s request to a political attack on the former president may not prove to be successful for Trump’s legal team if the House’s lawyers can show that they have a legislative purpose in seeking the documents.

“That doesn’t really mean that there’s not merit here,” Pomp said. “Just because you’ve got a bunch of Democrats that would love nothing better than to publicize everything that is turned over to Ways and Means really doesn’t affect the legal issue.”

In June, Rep. Richard Neal (D-Mass.), the chairman of the Ways and Means Committee, sent a letter to the Treasury Department saying that his panel is continuing to seek the returns in order to inform their legislative efforts, “including, but not limited to, the extent to which the IRS audits and enforces the Federal tax laws against a President.”

“There have been claims that the true and sole purpose of the Committee’s inquiry here is to expose former President Trump’s tax returns. These claims are wrong,” Neal wrote. “We have a duty to our constituents to eliminate unfairness where we see it, and we have an obligation to do so by legislating in an informed and responsible manner.”

The Manhattan district attorney’s office obtained Trump’s tax returns earlier this year after a protracted court battle over a grand jury subpoena. Last month, the office charged the Trump Organization and its Chief Financial Officer Allan Weisselberg with tax fraud.

Last year, the Supreme Court ruled that Trump, who was still in office at the time, had no special immunity to such grand jury subpoenas, rejecting his lawyers’ arguments of blanket presidential protections.

But in a similar set of cases involving congressional subpoenas for Trump's personal financial records, the Supreme Court was not as definitive, sending the cases back down to the lower courts and advising judges to take a more balanced approach when resolving such disputes between the legislative branch and the president.

It's unclear how much of a role Trump's status as a former president will play in the Ways and Means case or whether that would offer him any sort of legal protections against congressional inquiries.

Pomp said the case is more likely to focus on the committee's stated goals for seeking the documents.

"There are untested issues here. A judge is going to have to determine whether there's a sufficient legislative purpose, while paying proper respect to the legislative branch of the government and their powers," Pomp said. "I think it will be difficult on a judge to say this is outside the bounds of the law." ●

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BIDEN'S VACCINE RULES TO SET OFF BARRAGE OF LEGAL CHALLENGES

By Eric Tucker and Alanna Durkin Richer

WASHINGTON (AP) — President Joe Biden's sweeping new vaccine requirements have Republican governors threatening lawsuits. His unapologetic response: "Have at it."

The administration is gearing up for another major clash between federal and state rule. But while many details about the rules remain unknown, Biden appears to be on firm legal ground to issue the directive in the name of protecting employee safety, according to several experts interviewed by The Associated Press.

"My bet is that with respect to that statutory authority, they're on pretty strong footing given the evidence strongly suggesting ... the degree of risk that (unvaccinated individuals) pose, not only to themselves

but also unto others," said University of Connecticut law professor Sachin Pandya.

Republicans swiftly denounced the mandate that could impact 100 million Americans as government overreach and vowed to sue, and private employers who resist the requirements may do so as well. Texas Gov. Greg Abbott called it an "assault on private businesses" while Gov. Henry McMaster promised to "fight them to the gates of hell to protect the liberty and livelihood of every South Carolinian." The Republican National Committee has also said it will sue the administration "to protect Americans and their liberties."

Such cases could present another clash between state and federal authority at a time when Biden's Justice Department is already suing Texas over its new state law that bans most abortions, arguing that it was enacted "in open defiance of the Constitution."

The White House is gearing up for legal challenges and believes that even if some of the mandates are tossed out, millions of Americans will get a shot because of the new requirements — saving lives and preventing the spread of the virus.

Biden is putting enforcement in the hands of the Occupational Safety and Health Administration, which is drafting a rule "over the coming weeks," Jeffrey Zients, the White House coronavirus response coordinator, said Friday. He warned that "if a workplace refuses to follow the standard, the OSHA fines could be quite significant."

Courts have upheld vaccination requirements as a condition of employment, both before the pandemic — in challenges brought by health care workers — and since the coronavirus outbreak, said Lindsay Wiley, director of the Health Law and Policy Program at American University Washington College of Law.

Where Biden's vaccine requirements could be more open to attack is over questions of whether the administration followed the proper process to implement them, she said.

"The argument that mandatory vaccination impermissibly infringes on bodily autonomy or medical decision making, those arguments have not been successful and I don't expect that to change," Wiley said. "I think the challenges that are harder to predict the outcome of are going to be the ones that are really

sort of the boring challenges about whether they followed the right process.”

Emergency temporary standards — under which the rules are being implemented on a fast track — have been particularly vulnerable to challenges, Wiley said. But the risks presented by the coronavirus and the existence of a declared public health emergency could put this one “on stronger footing than any other ones past administrations have tried to impose that have been challenged in court,” she said.

Indeed, the question of whether the mandate is legally sound is separate from whether it will be upheld by judges, including by a conservative-majority Supreme Court which has trended toward generous interpretations of religious freedom and may be looking to ensure that any mandate sufficiently takes faith-based objections into account.

Vaccination “has become politicized and there are many Republican district judges who might be hostile to the regulation for political reasons,” said Michael Harper, a Boston University law professor. “I could imagine an unfortunate opinion that attempted to justify this political stance by rejecting the use of OSHA against infectious disease rather than against hazards intrinsic to the workplace,” Harper wrote in an email.

The expansive rules mandate that all employers with more than 100 workers require them to be vaccinated or test for the virus weekly, affecting about 80 million Americans. And the roughly 17 million workers at health facilities that receive federal Medicare or Medicaid also will have to be fully vaccinated.

Biden is also requiring vaccination for employees of the executive branch and contractors who do business with the federal government — with no option to test out. That covers several million more workers.

Republican-dominated Montana stands alone in having a state law on the books that directly contradicts the new federal mandate. The state passed a law earlier this year making it illegal for private employers to require vaccines as a condition for employment.

But University of Montana constitutional law professor Anthony Johnstone said the federal rules would trump the state law. That means larger Montana businesses that previously couldn’t require their employees to get vaccinated will now likely be required to, including

hospitals that are some of the largest employers in the sparsely populated state. Given that the rules are still being drafted and haven’t been released, experts say the devil is in the details. It remains to be seen exactly what the rule will require employers to do or not do, and how it accounts for things such as other rights that unvaccinated employees may assert, such as the right to a disability accommodation, Pandya said.

For example — with the growing number of fully remote businesses and workers — if the rules are written to include people who don’t have workplace exposure, “there certainly is room for an issue there,” said Erika Todd, an employment attorney with Sullivan & Worcester in Boston.

Charles Craver, a labor and employment law professor at George Washington University, said the mandate presented a “close question” legally. But he said the Biden administration did have a legitimate argument that such a requirement was necessary for employers to protect the safety of workers, customers and members of the public.

The thornier question, though, is how employers — and courts — will sort through requests for accommodations for employees on religious or other grounds. Though such accommodations may include having an employee work from home, “you can have a situation where someone has to be present and you can’t provide an accommodation because of the danger involved,” he added.

“I would not be a betting person if this went up before the Supreme Court,” Craver said. “I could even picture the court divided 5-4, and I wouldn’t bet which way it would go.”

Richer reported from Boston. Reporter Iris Samuels contributed to this report from Helena, Montana. Samuels is a corps member for The Associated Press/Report for America Statehouse News Initiative. Report for America is a nonprofit national service program that places journalists in local newsrooms to report on undercovered issues. ●

‘DRAMATIC’ INCREASE IN IRS CAPITAL-GAINS TRANSACTIONS AS BIDEN ADMINISTRATION CONSIDERS RAISING TAX RATES ON THE WEALTHY

Through July, millionaires reported roughly \$140.5 billion in combined capital gains and/or losses, up from \$118.4 billion one year earlier

By Andrew Keshner

Even before Joe Biden stepped into the White House, some financial advisers and accountants were predicting their rich clients would act fast to take advantage of lower tax rates before a Democratic-majority Congress could raise them.

As lawmakers mull higher rates for the wealthy, new numbers from the Internal Revenue Service released this week suggest that’s exactly what’s been happening.

By late July, taxpayers reported approximately \$64 billion extra in capital gains and/or capital losses compared to the same period in the prior tax season, according to IRS filing season statistics released Tuesday.

By late July, taxpayers reported \$64 billion extra in capital gains and/or capital losses compared to the prior tax season.

What’s more, taxpayers worth at least \$1 million — people whom Biden has his eye on especially — reported approximately \$22 billion more in net capital gains and/or losses than at the same point in the previous tax season, the statistics showed.

The year-over-year increase is “dramatic” according to Richard Pomp, a professor at the University of Connecticut School of Law, who specializes in taxation. “That’s more than just the increase in the stock market would suggest.”

Just over 23 million returns reported net capital gains/losses through late July, up from around 20.7 million at the same point last year. The total amount of capital gains and/or losses were around \$390.8 billion, up from approximately \$326.8 billion year-over-year.

Through July, millionaires and above reported roughly \$140.5 billion in combined capital gains and/or losses, up from \$118.4 billion one year earlier.

The statistics do not break out the amount of the gains or the amount of losses.

People have through Oct. 15 to file income-tax returns if they have an extension; historically, more complicated returns, which also typically come from wealthier households, come later in the year.

By the end of last year, taxpayers reported approximately \$794.4 billion in net capital gains/losses, IRS statistics show.

‘INCREASED AMOUNT OF URGENCY’

“I think most taxpayers expect we are at a low point for the time being in terms of tax rates,” said Ross Bruch, senior vice president and senior wealth planner at Brown Brothers Harriman, a private bank for the ultra-high net worth.

Accelerating capital gains transactions may be part of the explanation for the increase, Bruch said. “I think you also have several years of market growth, and it might be a point in time when people decided to take chips off the table.”

In his own work with clients who average between \$25 million and \$30 million, Bruch didn’t see the chance of higher taxes playing into stock-market investment decisions — but he did see it quicken private business sale talks for people already leaning towards selling in the coming years.

Especially during the summer, there was “an increased amount of urgency in most discussions,” Bruch said.

The IRS capital-gains statistics are a good way to peek into the strategies of the well-off at a heady time of tax-policy debate and persistent market turmoil.

With some exceptions, the highest rate for capital gains right now is 20%. That top tax rate on assets appreciating in value — be it a stock, bond, investment

property, a closely-held business or otherwise — applies for individuals making at least \$441,450 and married couples making above \$496,600.

Another 3.8% net investment income tax applies for individuals making at least \$200,000 and married couples making \$250,000.

In an effort to tax wages and wealth at the same rate, Biden wants to put the top income tax rate at the Obama-era 39.6%, and also have the same 39.6% capital-gains rate apply to households making at least \$1 million. Factoring in the 3.8% net investment income tax, the rich would face a 43.4% rate.

Biden's tax hikes would pay for social spending programs, including paid leave and boosted child tax-credit payments. Sen. Joe Manchin, a centrist Democrat from West Virginia and a much-needed 'yes' vote, reportedly wants a "strategic pause" until 2022 on the plan.

Meanwhile, Congressional Democrats in the Ways and Means Committee have recently countered with a proposed 25% top rate for capital gains.

The tax rate for people making at least \$5 million would be 31.8%, one tax expert previously noted; that's the 25% rate, plus the 3.8% net investment income tax — in addition to a 3% surtax.

SPIKE IN ROTH IRA CONVERSIONS

Other ways people act now to reduce future taxes can be found in the conversion from a traditional IRA, which uses pre-tax dollars, to a Roth IRA, which uses after-tax dollars and comes out tax-free. A conversion is a way to avoid higher tax rates when the money comes out at a future date.

In 2019, there were 22% more conversions to Roth IRAs compared to 2018, according to Fidelity Investments data. In 2020, there were 67% more conversions to Roth IRAs compared to a year earlier.

Research on the times before other tax-rate increases show people trying to make the best of the moment.

Decades ago, the top statutory rate for capital gains climbed to 28% in 1987, up from 20%. Ahead of those changes, "realizations" — the sale triggering the capital gains taxation — climbed 60% in 1986, according researchers at the nonpartisan U.S. Congress committee

Joint Committee on Taxation and the Tax Policy Center, a think tank.

Decades later, there was a 40% increase in "realizations," ahead of the 2013 tax-policy changes that raised the rate to 20% and brought on the 3.8% net investment income tax, the researchers said.

The Biden administration and Ways and Means proposals offered no lead time before the rate hike would take effect, as a move to avoid sell offs.

In May, the Biden administration said its proposed rate hike would have been effective as of April 28, when the president unveiled the plan. The Ways and Means Committee proposal would be effective starting Sept. 13.

'SELLING PRESSURE ON AN OVERHEATED MARKET'

Wealthy Americans making transactions ahead of expected tax hikes matters, said Pomp, the University of Connecticut School of Law professor. He supports a capital gains rate hike for the rich, but policymakers still need to know it could apply "selling pressure on an overheated market."

"When you are in this kind of environment, it doesn't take much to send people for shelter," he said.

On Monday, the stock market took a licking when the Dow Jones Industrial Average DJIA, -0.17% fell 1.8%, the S&P 500 SPX, -0.84% dropped 1.7% and the Nasdaq Composite COMP, -1.92% fell 2.2%, troubled by the debt woes of property giant China Evergrande Group. 3333, -0.88%

Despite an attempted recovery of losses on Tuesday, the benchmarks mostly ended lower. The Dow and S&P 500 dropped 0.1% while the Nasdaq Composite notched a 32-point gain, or 0.2%. The markets were up slightly on Wednesday.

Bruch also said capital gains and losses reported on a person's tax return can have wider significance because of the questions about what happens next in an economy trying to recover from a pandemic.

How are profits reinvested? Where will they be reinvested when there's more clarity on what action the Biden administration takes? "Will they just keep their powder dry on the sidelines?" Bruch added.

All of this reflects a great deal of uncertainty, and whether any of the tax proposals swirling around will become law, Bruch said. “The increase in sales does have implications,” he said, “but we’re too in the thick of it to understand the implications just yet.” ●

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JURY AWARDS \$10 MILLION TO WHITE MALE EXECUTIVE IN DISCRIMINATION CASE

The jury award for David Duvall, who was fired from his job at Novant Health in North Carolina in 2018, could be reduced under federal law.

By Michael Levenson

A federal jury in North Carolina has awarded \$10 million in damages to a former health care executive who argued that he was fired because he is a white man and his employer was trying to diversify, court records show.

The employer, Novant Health, which oversees 15 hospitals and hundreds of outpatient centers and clinics, argued that the former executive, David Duvall, had been fired because his superiors “had very little confidence” in him as a leader — not because of his race and sex.

But a federal jury found on Tuesday that Mr. Duvall’s race and sex had been motivating factors in his termination and that Novant Health had failed to prove that it would have fired him regardless of those factors.

The jury awarded Mr. Duvall \$10 million in punitive damages, a sum that is likely to be reduced by the trial judge, according to Sachin S. Pandya, a professor at the University of Connecticut School of Law. He said that Title VII of the Civil Rights Act caps punitive damages at \$300,000 for employers with more than 500 employees.

Mr. Duvall’s lawyer, S. Luke Largess, said on Friday that his client also has a discrimination claim under North

Carolina law in which the \$300,000 cap does not apply. He said there will be a hearing in 30 days on the amount of back pay and front pay to be awarded.

The verdict came nearly two years after Mr. Duvall filed a federal lawsuit against Novant Health, contending that he had been fired to achieve racial and gender diversity, in violation of the Civil Rights Act of 1964. That law prohibits discrimination based on race, color, religion, sex or national origin.

“We are pleased that the jury agreed with Mr. Duvall that his race and gender were unlawful factors in his termination — that he was fired solely to make room for more diverse leaders at Novant Health,” Mr. Largess said in a statement.

He said that the jury had included six women and two men and that six were white, one was Hispanic and the forewoman was Black.

Mr. Duvall’s lawsuit was “decidedly not a statement against diversity and inclusion programs,” Mr. Largess said.

“The lawsuit was only about the need to run such programs lawfully,” he said. “We believe the punitive damages award was a strong message that an employer cannot just fire employees based on their race or gender to create opportunities to achieve diversity targets. That is plainly unlawful and very harmful, and that is what the jury denounced here.”

Novant Health said that it disagreed with the verdict.

“We are extremely disappointed with the verdict, as we believe it is not supported by the evidence presented at trial, which includes our reason for Mr. Duvall’s termination,” Novant Health said in a statement. “We will pursue all legal options, including appeal, over the next several weeks and months.”

Novant Health, a nonprofit organization with more than 35,000 employees, said the verdict would have no effect on its efforts to diversify its work force.

“Novant Health is one of thousands of organizations to put in place robust diversity and inclusion programs, which we believe can coexist alongside strong nondiscriminatory policies that extend to all races and genders, including white men,” the organization said. “It’s important for all current and future team members to know that this verdict will not change Novant

Health's steadfast commitment to diversity, inclusion and equity for all."

In his lawsuit, Mr. Duvall said that he had a successful career in marketing and public relations when Novant Health hired him as a senior vice president of marketing and communications on Aug. 5, 2013.

On July 30, 2018, Novant Health fired him without warning and ordered him off the premises immediately, the lawsuit states.

Mr. Duvall said that his superior had told him that his termination had "nothing to do" with his work performance and that he had "done everything asked of him and more," according to the lawsuit. Mr. Duvall's job performance "had been very highly rated, both internally and externally," the lawsuit states.

Instead, Mr. Duvall contended that his termination had stemmed from "the distortion of a good intention."

In 2015, Novant Health signed onto a commitment by health care systems nationwide to address health inequities, which spawned a commitment to diversity and inclusion, Mr. Duvall said in court documents.

By 2018, that commitment "had turned into avowed, even boastful, 'strategic imperative' to rely on racial and gender targets to reshape Novant Health's work force and leadership to reflect the community it served," according to the documents.

"As a direct result," Mr. Duvall was fired and replaced by a white woman and a Black woman, and other white men were also dismissed without warning and replaced by women or members of minority groups, his court documents said.

Novant Health argued that Mr. Duvall's claims were "premised on complete speculation wholly lacking in evidence."

As a highly compensated senior vice president, Mr. Duvall was expected to "perform exceptionally, not just demonstrate good or adequate performance," Novant Health said in court documents.

Mr. Duvall "fulfilled what was asked of him," according to Novant Health, but "demonstrated over time that he was not exceptional or a successor" to his superior.

For example, Novant Health said that Mr. Duvall was "unable to speak publicly" in front of the board of

directors, which prompted the chief executive "to question his command."

Mr. Duvall's superior "did not see him as an enterprise leader" who was willing to collaborate with others, Novant Health said. And Mr. Duvall missed a critical meeting to discuss the "patient experience" with other executives, Novant Health said.

"From a talent development, strategic planning, and succession planning perspective, I knew we could improve on talent in David's role," Mr. Duvall's superior wrote in court papers. ●

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UCONN LAW INTRODUCES NEW CENTER ON POLICING

By Cayla Bamberger

Law professors and students at UConn have goals to shape the local, state and national conversation about policing.

Last week, the University of Connecticut School of Law announced the creation of the Center of Community Safety, Policing and Inequality to rethink community safety and the goals of law enforcement institutions.

The new center has plans to research policy, advise legislative and judicial reform efforts, and host related talks and events.

"Police reform is ripe at this political, historical moment," said Kiel Brennan-Marquez, center director and law professor of constitutional law, policing, evidence, and law and technology.

"We're heading into this in a truly open-minded way, without a specific set of policy objectives in mind," he said, and described the academic hub as "a vehicle" to have hard but productive conversations about reform.

The center, he said, was inspired by conversations throughout summer 2020 with legislators and local

groups to draw up policing reform legislation, and with the then-incoming law school dean. Brennan-Marquez said they realized the conversation should continue.

“We should have a more structured mechanism for giving our input into reform efforts, in a way that’s informed by trickle-down scholarship that makes an impact in the world,” the director said.

Several projects are already in the works at the center, according to its website, including one on police funding trends relative to department size and crime rates, and another on how law enforcement institutions can silence the communities they mean to protect.

Student fellows represent a range of ideologies and backgrounds, including an active-duty police officer, and an organizer with the Black Lives Matter movement.

“I am very excited about the establishment of this new center, especially at this critical time in our country’s history,” said Eboni Nelson, dean of the law school.

“It reflects not only UConn Law’s broad expertise in criminal law and related fields,” she said, “but also our commitment to be engaged in local, national and global efforts to help bring about a more just and equitable society.”

Brennan-Marquez suggested that is one of the center’s main tenets: to have an impact off of UConn’s campus, including in Hartford, where the law school is located.

“We’re also starting to think about all the different forms community engagement might take,” he said. “I would love for it to feel like more of an open door, a porous boundaries, between the law school,” and its surrounding areas.

The director said in the long term the center could find ways to create pipelines for students, especially in Connecticut’s cities, to law school.

Meanwhile, the team at the center is interested in revamping criminal justice curriculum and the types of degrees available to those pursuing the subject at the law school. Brennan-Marquez said the center might rethink not only its JD program, but also consider degrees and certificates for non-lawyers and undergraduate students.

The center will host a kick-off event, an online lecture and Q&A session with a retired Connecticut Supreme Court justice, on Tuesday, Nov. 16. Brennan-Marquez is

also planning for the spring and next year, including monthly colloquiums and workshops, conferences and large events, such as a possible 10-year retrospective of *Floyd v. New York*, the landmark challenge to New York City’s stop-and-frisk program.

“These are hard questions — let’s think about them collaboratively,” Brennan-Marquez said.

“It’s not that we’re going to shy away from controversy, and I don’t think we could if we tried,” he said. “But we have a unique opportunity working in this state, in this climate, and with a student-base that is going to become the next generation of legislators, judges, and leaders of all kinds of public and private institutions.” ●

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ETHICS AWARENESS, EDUCATION UP AS ATTORNEY DISCIPLINE FALLS

By Melissa Heelan

Heightened ethics awareness among lawyers and more emphasis on continuing education may be helping to reduce misconduct complaints and discipline in bigger states even as the attorney population rises, some experts say.

While data doesn’t point to a single reason for multi-year declines in complaints and sanctions reported by several states tracked by Bloomberg Law, the falloff coincides with an uptick in legal industry changes and other efforts to better address discipline.

California, Florida, Texas, Illinois, Ohio, and New Jersey were among those reporting continued declines in complaints and sanctions in their latest annual disciplinary reports. Data for New York, the state with the most lawyers, was uneven in key areas. Discipline was up slightly in Texas.

“Long-term trends in complaints about attorney misconduct and attorney discipline can be traced to shifts in the legal profession, the composition of the

attorney population, and the State Bar's efforts to prevent attorney misconduct," the California State Bar concluded in its 2020 report.

Sanctions usually follow complaints made at least a year previous so the pandemic's impact is not understood yet. Anecdotal reporting for 2020-21 suggests complaints temporarily dropped more sharply than usual in some states due to a falloff in legal activity.

UNEVEN REPORTING

Lawyers overall appear to be heeding ethical mandates, but tracking trends is complicated by variations among states in what disciplinary information is made public and how it's analyzed and presented. Jonathan Arons, a legal ethics adviser in San Francisco, said, for instance, that California isn't clear enough on what constitutes a complaint.

Still, California reported its rate of discipline fell from 4 per 1,000 attorneys in 2011 to 1.4 last year. In Florida total discipline orders decreased steadily from 316 in 2016-17 to 224 in 2020-21, according to the bar.

New York has four grievance committees that report discipline for different regions, but there's no standard template. The overall disciplinary numbers for the First Judicial Department that covers Manhattan and the Bronx, where data was updated and accessible, held steady even as the number of in-state attorneys increased from 175,195 in 2015 to 185,076 in 2020, according to New York's attorney population reports.

SMALL PERCENTAGE

The lawyer population nationwide has increased by more than 8% to 1.3 million between 2011-21, according to the ABA, and very small percentage are investigated for misconduct or disciplined. Sanctions commonly run from license suspension to reprimand. Hundreds are disbarred nationally each year, the ABA says.

Headlines this past year highlighted sanctions against former New York Mayor and Donald Trump confidant Rudy Giuliani and other attorneys for pushing 2020 election fraud litigation. But disciplinary cases frequently involve small firms or solo practitioners. Illinois, for example, reported nearly half of 81 lawyers sanctioned in 2020 were solo practitioners.

Leslie Levin, an expert on ethical decision-making and lawyer discipline at the University of Connecticut School of Law, said individual clients in personal matters, including immigration and family law, typically file disciplinary complaints. Illinois reported that criminal law, domestic relations, and real estate grievances topped its list.

There are unusual cases like the attorney who accidentally brought a loaded gun into a court or the one whose practice was described by a court as "anarchy." But many cases center around the same handful of ethical lapses.

Neglecting a client's interest accounted for nearly a third of disciplinary cases in Ohio in 2020. Mismanaging client trust accounts and over-billing also made the list. The top area of misconduct by sanction in Texas was communication, at 28%, followed closely by "integrity" at 24%, and neglect at 23%.

CHANGING PROFESSION

Most legal ethics experts were reluctant to cite specific reasons for declining discipline, but noted changes aimed at lawyers and the industry that could have an impact.

The direction may be "primarily due to lawyers and law firms having a better understanding and appreciation for the benefits of investing in risk management," Kendra Basner, a discipline defense lawyer with O'Rielly & Roche in San Francisco, said of disciplinary figures in her state.

Experts in various states also cited more ethics education, greater attention paid to possible connections between substance abuse and misconduct, and tougher sanctions for violations that previously resulted in lighter penalties. More women in the profession may also play a role.

New York's bar has made a "concerted effort" to offer attorneys resources and information on well being, including having active lawyer assistance programs, said Tyler Maulsby, an ethics attorney with Frankfurt Kurnit Klein & Selz in New York.

The legal profession, which has long emphasized work over quality of life, has only recently taken steps to address burnout and mental health issues, for instance. Attorney substance abuse is a well-known problem.

More than a quarter of lawyers disciplined in Illinois last year had at least one substance abuse or mental health issue. The Illinois disciplinary commission has a pretrial diversion program for lawyers who are at risk with alcohol, substance abuse, or other mental health problems, said Matthew Henderson of Hinshaw & Culbertson LLP in Chicago. It seeks to treat the underlying condition to allow a return to productive practice.

The growing proportion of women in the profession may also play a role. States, including California, Texas, and Illinois, report significantly fewer claims against women. In Texas, 79% of the 372 sanctions handed out in 2020-21 were for men, and 21% for women.

In California, older veteran attorneys are more likely to run afoul of ethics rules and the growing female population in the legal profession skews younger, the State Bar said. There are also fewer female solo practitioners.

“To the extent that these two factors lead to differential complaint and discipline rates between male and female attorneys, it’s a more a difference in their exposure to risks than it is in behavioral patterns,” the State Bar said.

RISK MANAGEMENT, CLE

Basner in California highlighted risk-management efforts. Liability insurers are offering free ethics hot lines and attorneys are being required to report their compliance with continuing legal education (CLE) requirements.

Mandatory ethics CLE requirement in Illinois has been a “critical factor in reducing disciplinary complaints,” said Henderson.

Brian Tannebaum, an ethics lawyer in Miami, said the decline in Florida could partly be due to the growth in a state Attorney Consumer Assistance Program which helps weed out complaints that don’t merit investigation.

Proactive state bars, courts, and grievance committees help keep attorneys in line. Tougher sanctions for conduct that previously led to a reprimand or short-term suspension also could be a deterrent in Florida, Tannebaum said.

Another potential explanation: fewer lawyer-client transactions as people needing help find attorneys are too expensive and opt for cheaper “do-it-yourself” options.

“Clients are getting priced out of the market” and end up representing themselves, said Thomas McGarry, head of Hinshaw & Culbertson’s Professional Responsibility, Professional Liability and Risk Management Practice Group. ●

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WHY EXPERTS SAY A COVID VACCINE PASSPORT WOULD BE NOTHING NEW IN CT

By Jordan Nathaniel Fenster

Gov. Ned Lamont said Tuesday that a COVID vaccine passport was possibly in the works for Connecticut. But vaccine passports have been around long before the coronavirus, and are similar to other initiatives that are widely accepted, experts say.

The goal, Lamont said, was to make it easier for businesses to verify their customers have been vaccinated.

“All we would do is make it easier for them to do so and standardize it,” Lamont said. “Probably we’d do it with other states in the region, because I think that makes it a lot more effective. I’m not sure we’re going to get to it this year, but we’re certainly looking at it.”

Arthur Caplan, a Ridgefield resident who founded New York University’s Department of Bioethics, said vaccine passports are long overdue in Connecticut.

“It should have been done last year,” he said, arguing that vaccine passports are “a way to reduce forgeries and counterfeits.”

The discussion in Connecticut comes after Massachusetts Gov. Charlie Baker said this week that

his state will implement a QR code-based vaccine verification system.

"It's a universal standard and we've been working with a bunch of other states, there's probably 15 or 20 of them, to try to create a single QR code that can be used for all sorts of things where people may choose to require a vaccine," Baker told GBH News.

Methods of verifying vaccination status have been hotly debated since the late 1800s, as British researcher Sanjoy Bhattacharya told NPR. It began with verification of vaccination against the bubonic plague and smallpox in India.

"When there were outbreaks in South Asia people from there were not allowed to board ships, for instance, to Aden or Great Britain, or Mecca for the Hajj, without government-issued smallpox vaccination certificates," Bhattacharya told NPR.

Sebastián Guidi, a lawyer and researcher at the Yale School of Law, studied how educating those who object to vaccine passports on the history of such initiatives can affect their outlook on such proposals.

When those who object are informed of the history, "in all cases, there is an increase in acceptance," he said.

Guidi said there is little difference between phone-based vaccine passports and other methods of verification. Many college students, he pointed out, are required to show proof of vaccination to attend classes. Many employers are requiring workers to show proof of vaccination.

"Requiring proof of vaccination in order to engage in certain activities is not a new phenomenon,"

Guidi wrote, along with coauthors Alessandro Romano and Chiara Sotis. "Government agencies, and schools and universities in all 50 states have required proof of vaccination for decades."

There are circumstances in which airlines require proof of vaccination, and though President Joe Biden has said he will not institute a nationwide vaccine passport, foreign travelers are required to show proof of vaccination to enter the country.

"Starting on Nov. 8, foreign national air travelers to the United States will be required to be fully vaccinated and to provide proof of vaccination status prior to boarding an airplane to fly to the United States, with only limited

exceptions," the U.S. State Department states on its website.

The International Air Transport Association, the trade association representing international airlines, created its own COVID travel pass, described as "a mobile app that helps travelers to store and manage their verified certifications for COVID-19 tests or vaccines."

"It is more secure and efficient than current paper processes used to manage health requirements," the IATA wrote.

Guidi said that when shown these facts — if vaccine passports are presented as the "status quo" instead of something new — there is far wider acceptance, which could affect public policy.

"We think that our research will result in different ways of communicating passports," he said. "This might affect their acceptance and their prevalence."

In March, Israel was the first nation to issue a digital vaccine passport, called the Green Pass, with several other nations followed suit. In the United States, New York was the first to the fore with its Excelsior Pass.

Like the IATA's travel pass, vaccinated individuals using New York's Excelsior Pass input their information into a smartphone app, which can then be presented upon request.

Caplan argued that there is no functional difference between carrying the vaccine card issued when you are vaccinated and using a smartphone app.

"We de facto have had a vaccine passport using our CDC cards as a passport for many, many months," he said.

In fact, vaccination data is already available online in Connecticut.

An executive order signed earlier this year by Lamont granted the state's public health commissioner the power to "disclose information reported to the Department of Public Health regarding a COVID-19 vaccine recipient's immunization information, for the purposes of reducing the spread of COVID-19."

That allowed doctors and public health officials, as well as patients, access to vaccination records. It did not conflict with the federal Health Insurance Portability and Accountability Act, commonly referred to as HIPAA,

according to John Cogan, an assistant professor of law at the University of Connecticut.

“People get all wigged out about the release of medical information,” he said.

Connecticut also embarked on a similar initiative with regard to driver’s licenses. Connecticut is among the first eight states to implement a digital driver’s license, accessible on Apple Wallet. ●

College of
Agriculture,
Health and
Natural Resources

ARE POTATOES GOOD FOR YOU?

Stop worrying about the carbs. You can fit spuds into a nutritious diet.

By Lisa Lombardi

Here are two facts about potatoes: They're extremely nutritious, and you should probably cut back on how often you eat them.

How can both be true? "Potatoes are a top source of potassium, which is an essential mineral for heart health," says Loneke Blackman Carr, PhD, an assistant professor of nutrition at the University of Connecticut. A small potato (about 5 ounces) has 23 percent of the amount you should consume every day. You also get 26 percent of the recommended amount of vitamin B6 (key for neurological health), along with iron, vitamin C, magnesium, and fiber.

We eat more potatoes than any other vegetable—almost 50 pounds a year per person. But that's a concern because potatoes have a high glycemic index, meaning they raise blood sugar rapidly after you eat them.

Experts think this is why some studies have found a link between potatoes and an increased risk of cardiovascular disease, hypertension, type 2 diabetes, and excess weight, regardless of the way they're cooked.

The research isn't consistent, however. For example, in a 2019 study published in the journal *PLOS One*, researchers followed more than 400,000 people for 16 years and saw no differences in the risk of early death from any cause between those who ate the most potatoes and those who ate the least.

What's a spud lover to do? These tips will help you get all the advantages of potatoes while sidestepping the risks.

THINK CARB, NOT VEGETABLE

Botanically speaking, potatoes are vegetables, but nutritionally their high starch content puts them in the carb category.

Potatoes should replace rice or bread in your meal, not other veggies, says Michelle Cardel, PhD, an assistant professor in the department of health outcomes and biomedical informatics at the University of Florida College of Medicine. The Department of Agriculture says women over 50 shouldn't eat more than 4 cups of starchy vegetables per week (for men, it's 5 cups). In addition to potatoes, these include cassava, corn, green peas, parsnips, and plantains.

MAKE FRIES A 'SOMETIMES' FOOD

French fries tend to be higher in sodium and calories than nonfried potatoes. And in some studies, fries posed more of a risk than potatoes overall.

More research is needed, but a 2017 study of people over age 50, for example, found that those who ate fries two or three times a week had a 95 percent increase in the risk of early death from any cause; nonfried potatoes didn't raise the risk. A 2019 analysis of 28 studies found that eating fries every day upped the risk of type 2 diabetes by 66 percent and high blood pressure by 37 percent. Eating potatoes prepared in other ways raised the diabetes risk only slightly and hypertension not at all.

Oven-fried potatoes may be a healthier bet. Slice potatoes lengthwise and drizzle them with olive oil and a little salt, then bake at 425° F for about 25 minutes. (For chips, cut horizontally and bake at 400° F for 25 minutes.) Or whip some up in your air fryer.

TOP IT RIGHT

Too often we mash potatoes with cream and butter or pile baked potatoes with sour cream, bacon, and cheese. That means excess calories and saturated fat, which is bad for your heart health.

A tablespoon of butter, for example, adds more than 100 calories and 7 grams of saturated fat; a tablespoon of sour cream packs another 30 calories and 1.5 grams of saturated fat.

For a healthier option, cut a potato in half, drizzle it with olive oil and rosemary, and bake in a 400° F oven. Then put it under the broiler for a few minutes until brown on top, suggests Lisa R. Young, PhD, an adjunct professor of nutrition at New York University.

And you can slim down mashed potatoes by swapping out cream and butter for low-fat plain Greek yogurt. “It has a similar taste and consistency, plus protein and healthy fats,” Cardel says.

EAT THE POTATO RAINBOW

White potatoes have antioxidants, which help fight cell damage. But getting a mix of red-, purple-, and yellow-fleshed spuds will give you a greater range (such as anthocyanins and carotenoids) than sticking with your standard russets.

Braised Fingerling Potatoes with Rosemary

Long and thin, fingerlings have feathery skins (so they don't need peeling) and don't break apart when cooked. This healthy recipe from CR's test kitchens (pictured above) shows off their beautiful shape and delicate flavor.

- 1 pound fingerling potatoes, scrubbed and halved lengthwise
- 1 shallot, peeled and quartered, root left intact
- 3 sprigs fresh rosemary, plus 1 teaspoon chopped
- 2 tablespoons butter
- 1/8 teaspoon each salt and freshly ground black pepper
- 1 cup reduced-sodium chicken broth

Directions

1. Arrange the potatoes in a single layer in a large skillet. Put shallot pieces and rosemary sprigs in between the potatoes.
2. Add 1 tablespoon butter, and salt and pepper; pour chicken broth over potatoes.
3. Partially cover the pan and bring the mixture to a gentle boil over medium heat. Lower heat and simmer, stirring occasionally, until potatoes are tender when pierced with a fork, about 20 to 25 minutes.

4. Remove and discard the shallot pieces and rosemary sprigs. Using a slotted spoon, place the potatoes on a serving platter.

5. Increase the heat to high and boil the remaining liquid 2 minutes uncovered until reduced slightly. Stir in the remaining 1 tablespoon butter and pour sauce over potatoes: sprinkle with chopped rosemary. Serve immediately.

Makes 4 servings

Nutrition information per serving: 150 calories, 6 g fat, 3.5 g saturated fat, 21 g carbs, 2 g fiber, 1 g sugars (includes 0 g added), 4 g protein, 220 mg sodium

TOP AIR FRYERS FROM CR'S TESTS

Using an air fryer to cook potatoes can give you crispy fries without all the oil. These three, listed alphabetically, did well in CR's tests. ●

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RACIST ZONING PRACTICES ARE SO PREVALENT, ‘YOU CAN EVEN SEE IT IN THE FLOOD DATA’

By Dharna Noor

There's no question that flooding is becoming worse due to the climate crisis pushing up our sea levels and making heavy downpours more common. But the risk doesn't affect us all equally. A report released by the real estate brokerage firm Redfin this week shows that formerly redlined areas are more vulnerable to the threat of floods.

Redlining was a discriminatory lending practice in the 1930s, wherein house appraisers mapped cities for the federal Homeowners' Loan Corporation with different colored lines to indicate how desirable areas were to live in. Neighborhoods deemed “best” or “still desirable” were marked with green and blue lines,

respectively. Those considered “definitely declining” were marked in yellow, and zones declared “hazardous”—overwhelmingly Black neighborhoods—were outlined in red. The reverberations of this segregationist history are still visible. Today, 58.1% of residents of neighborhoods that were marked with yellow or red lines are still people of color, compared with just 40.4% of households in neighborhoods that were labeled blue or green.

Formerly redlined neighborhoods are exposed to more heat and have higher rates of respiratory problems tied with air pollution. The new analysis shows the flood risk is greater, too. Redfin examined floodplain data from 38 major metropolitan areas and found that today’s flood risk maps look very similar to those redlining maps. According to the report, 8.4% of homes in areas that were once deemed undesirable and marked with yellow or red lines face high flood risk, compared with just 6.9% of homes in areas that were marked with green or blue lines.

In some cities, the disparity is much larger. The largest gap the researchers found was in Sacramento, where 21.6% of homes in redlined and yellowlined areas face high risk of flooding today, whereas just 11.8% of homes in greenlined and bluelined neighborhoods are highly vulnerable. In New York, 13.8% of homes in areas marked in red and yellow are at risk, versus 7.1% of homes in greenlined and bluelined neighborhoods. Boston and Chicago also saw large disparities.

Part of this disparity comes from the natural environment in which housing is built. Historically, climate-safe areas are prohibitively expensive for many Americans while affordable housing is often located in areas of low elevation altitude and proximity to regularly overflowing bodies of water. Many public housing projects, the majority of which are home to non-white Americans, have also been sited in floodplains.

“Decades of segregation and economic inequality shoehorned many people of color—especially Black Americans—into living in neighborhoods that are more vulnerable to climate change,” Redfin senior economist Sheharyar Bokhari said in a statement.

But though geography can make neighborhoods of color more vulnerable, built infrastructure also plays a role. The same factors that lead to redlined neighborhoods

being hotter can also affect flood risk. More pavement and fewer trees tend to crank up the urban heat island effect, but both also increase flood risk because pavement is a non-permeable surface so it can’t soak up floodwater, whereas trees can.

On top of that, the economic exploitation of and disinvestment in communities of color—especially Black communities—has made it more difficult for once-redlined communities to fund infrastructure projects needed to keep people safe. Flood-control infrastructure such as storm drains and levees requires regular maintenance, which costs money.

“Redlining kept home values in Black neighborhoods depressed, which in turn meant there was less money invested and reinvested in those neighborhoods for decades to come,” Bokhari added.

Neighborhoods of color are also more likely to experience hardship when floodwaters rise. For instance, when Hurricane Katrina overwhelmed New Orleans and surrounding areas in 2005, four out of seven zip codes that faced the costliest flood damage were home to at least 75% Black residents. After Hurricane Harvey touched down on Texas in 2017, roughly twice as many Black and Latinx residents reported that they had fallen behind on their mortgage payments in the wake of the storm compared white residents.

Another new report released this week shows that the topographic and economic risk factors are difficult to disentangle from one another. That study, published in the Proceedings of the National Academy of Sciences on Monday, specifically assessed river flooding risk in 50 different American metropolitan areas. To do so, the authors used a socio-hydrological model, plugging in local data from each region on highest yearly streamflow (the peak speed at which water moves through rivers and streams), flood insurance loss claims, active insurance policy records, and population density.

“The model attempts to simulate the behaviors, memories, and risk aversion of a group of people in response to floods,” James Knighton, an assistant professor in the Department of Natural Resources and the Environment at the University of Connecticut and lead author of the study, said.

Using the models of the 50 cities, the authors teased out patterns in how different communities respond to

floods. They found that the regions could be grouped into two groups. In the first category, which the researchers call “risk enduring” cities, residents are quick to purchase flood insurance as soon as flooding occurs, but are also quick to drop their insurance if a flood doesn’t happen again for a few years. This behavior was common in regions with higher concentrations of people of color, which also tended to be regions where rivers were more erratic, having more drastic fluctuations in streamflow.

Residents of cities who fall in the other group, which the authors refer to as “risk averse,” have different behaviors. In these cities, residents are slower to purchase insurance when floods occur. But once residents have that insurance, they’re less likely to drop it. This trend played out mostly in areas where the majority of residents are white, which also tended to be areas where streamflow stayed more level and predictable.

“This country has a big problem with race, and because it’s so big, you can even see it in the flood data.”

Knighton and the team aren’t sure exactly what historical factors have resulted in more people of color residing near erratic bodies of water, or how to separate hydrology and the socioeconomic trappings of race. In other words, it’s not clear how much risk comes from the rivers themselves, and how much of it comes from the fact that neighborhoods of color are less likely to have access to flood-protection infrastructure, personal funds for buying insurance, and information about the threat of flooding.

“It is very difficult to tease apart the two factors,” he said. “My guess is that socioeconomics dominate flood preparedness. If populations have limited ability to leverage federal programs for flood relief, then they are limited in how they can prepare for future floods. If communities have ample resources, then it becomes a risk-based choice.”

But he did say that it’s concerning that risk-averse white communities also tended to have much more flood control infrastructure like dams, and more access to federal assistance. The Federal Emergency Management Agency’s own data and reporting, for instance, has shown that the agency tends to “provide an additional boost to wealthy homeowners and others

with less need, while lower-income individuals and others sink further into poverty after disasters.”

“What happens is, cities and towns that have a lot of residents that are well-off can totally take advantage of these federal programs. They can use these programs as they were intended to be used because they employ large local governments and have people that know how to call FEMA up,” Knighton said. “So, the resources that exist end up getting used very unevenly.”

Both analyses illustrate the urgent need for truly equitable federal programs that limit flood risk for everyone. FEMA seems to know this, because for years, it has been working on an affordability framework aimed at ensuring that all communities have access to flood insurance. Under the program, officials would consider households’ socioeconomic status in particular areas and vary the price of the insurance based on residents’ means. They would also up their outreach in particularly vulnerable areas which may not have local officials who are focused on flood planning.

“This country has a big problem with race, and because it’s so big, you can even see it in the flood data,” said Knighton. “The next needed step to address that is to actually implement that framework right now.” ●

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AHA NEWS: 7 HEALTHY STRATEGIES TO NAVIGATE A FOOD SWAMP

By Michael Precker

On nearly every corner, and along the roads in between, the familiar signs comfort and tempt us: burgers and fried chicken, ice cream and doughnuts, sweets and treats galore.

Welcome to the food swamp, where Americans get bogged down in a morass of cheap, convenient, alluring – and very often unhealthy – culinary choices.

"All these fast-food companies with all their marketing are competing for our stomach space and our dollars," said Penny Kris-Etherton, distinguished professor of nutrition at Penn State University in University Park. "It's hard to make healthy choices when there are so many odds against you."

The term "food swamp" was coined about a decade ago to denote areas where fast-food chains and convenience stores abound, swamping healthier options such as grocery stores and restaurants with wider choices. They often coincide with food deserts, where a lack of convenient or low-cost supermarkets makes it harder to get fresh produce and nutritious food.

That combination all too often occurs in low-income and under-resourced neighborhoods, said Kristen Cooksey Stowers, an assistant professor at the University of Connecticut who specializes in health equity and food-related public policy.

"It's not that fast food or corner stores are inherently bad," she said. "But when it becomes the majority of what a neighborhood can rely on, that's a problem. We see areas inundated with unhealthy food."

Cooksey Stowers' research has shown a correlation between food swamps and obesity, and she led a 2017 study published in the *International Journal of Environmental Research and Public Health* showing food swamps were a better predictor of obesity than food deserts.

Kris-Etherton was chief author of an article last year in the *Journal of the American Heart Association* linking food swamps and food deserts to poor diet quality, obesity and cardiovascular disease, all of which can be more prevalent among low-income people, many of whom are Black and Hispanic and other people of color. The authors called for policy changes to address the disparities.

In the long term, Cooksey Stowers said, solutions include better zoning to limit clusters of fast-food outlets, incentives to build grocery stores and farmers markets in disadvantaged areas, and even requiring convenience stores to stock a certain percentage of healthy food.

"People need to realize they are empowered to be part of the change in their communities," she said.

In the meantime, if you're hungry, keep this in mind:

Carry a healthy snack. An apple, carrot sticks or some nuts in the car might keep you from overdoing it at the drive-thru. "Take something with you so you don't get really hungry," Kris-Etherton said. "When you're really hungry, you eat more."

Be wary of bargains. "We're all value-minded," Kris-Etherton said. "You see supersizes, or buy one get one free. Maybe that makes sense if you're with somebody, but not if you're by yourself."

Beware of beverages. Sugary sodas and coffee concoctions packed with flavors and cream can have more calories than an entrée. "People don't think of it as something they're eating," she said. "They think, 'It's a drink. I don't have to count it.' They do."

Pay attention to the extras. Mayonnaise on that burger or sub sandwich adds calories and fat. Ask for extra lettuce and tomato instead. So does the whipped cream stacked atop the coffee. "Doing without them is a small step, but a very good first step," Kris-Etherton said.

So what if they're open late? "There are brands trying to create the fourth meal of the day with all those late-night hours," Cooksey Stowers said. "You know that's terrible for the body. Stick with three meals a day."

Make a plan and stick to it. "Check out the menu and choose healthy options, like salads and grilled chicken instead of fried," Kris-Etherton said. "And if you can use the drive-thru, don't go in, so you're not tempted by seeing everybody eating burgers and fries with large sodas. Fries are OK on occasion but buy the small size or share an order with someone."

Just say go. "If you can, keep driving or stay on that bus to get to the supermarket instead of stopping off for the fast food," Cooksey Stowers said. "These are things that people know. We just have to eat less of the unhealthy stuff." ●

system. She also recommends installing a water filtration system. ●

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HOW WORRIED SHOULD YOU BE ABOUT CORONAVIRUS VARIANTS? A VIROLOGIST EXPLAINS HIS CONCERNS

By Paulo Verardi

Spring has sprung, and there is a sense of relief in the air. After one year of lockdowns and social distancing, more than 171 million COVID-19 vaccine doses have been administered in the U.S. and about 19.4% of the population is fully vaccinated. But there is something else in the air: ominous SARS-CoV-2 variants.

I am a virologist and vaccinologist, which means that I spend my days studying viruses and designing and testing vaccine strategies against viral diseases. In the case of SARS-CoV-2, this work has taken on greater urgency. We humans are in a race to become immune against this cagey virus, whose ability to mutate and adapt seems to be a step ahead of our capacity to gain herd immunity. Because of the variants that are emerging, it could be a race to the wire.

A variant in Brazil is overwhelming the country's health care system.

FIVE VARIANTS TO WATCH

RNA viruses like SARS-CoV-2 constantly mutate as they make more copies of themselves. Most of these mutations end up being disadvantageous to the virus and therefore disappear through natural selection.

Occasionally, though, they offer a benefit to the mutated or so-called genetic-variant virus. An example would be a mutation that improves the ability of the virus to attach more tightly to human cells, thus enhancing viral replication. Another would be a

mutation that allows the virus to spread more easily from person to person, thus increasing transmissibility.

POLITICAL ANALYSIS, WITHOUT PARTISANSHIP

None of this is surprising for a virus that is a fresh arrival in the human population and still adapting to humans as hosts. While viruses don't think, they are governed by the same evolutionary drive that all organisms are – their first order of business is to perpetuate themselves.

These mutations have resulted in several new SARS-CoV-2 variants, leading to outbreak clusters, and in some cases, global spread. They are broadly classified as variants of interest, concern or high consequence.

Currently there are five variants of concern circulating in the U.S.: the B.1.1.7, which originated in the U.K.; the B.1.351., of South African origin; the P.1., first seen in Brazil; and the B.1.427 and B.1.429, both originating in California.

Each of these variants has a number of mutations, and some of these are key mutations in critical regions of the viral genome. Because the spike protein is required for the virus to attach to human cells, it carries a number of these key mutations. In addition, antibodies that neutralize the virus typically bind to the spike protein, thus making the spike sequence or protein a key component of COVID-19 vaccines.

India and California have recently detected "double mutant" variants that, although not yet classified, have gained international interest. They have one key mutation in the spike protein similar to one found in the Brazilian and South African variants, and another already found in the B.1.427 and B.1.429 California variants. As of today, no variant has been classified as of high consequence, although the concern is that this could change as new variants emerge and we learn more about the variants already circulating.

MORE TRANSMISSION AND WORSE DISEASE

These variants are worrisome for several reasons. First, the SARS-CoV-2 variants of concern generally spread from person to person at least 20% to 50% more easily. This allows them to infect more people and to spread

more quickly and widely, eventually becoming the predominant strain.

For example, the B.1.1.7 U.K. variant that was first detected in the U.S. in December 2020 is now the prevalent circulating strain in the U.S., accounting for an estimated 27.2% of all cases by mid-March. Likewise, the P.1 variant first detected in travelers from Brazil in January is now wreaking havoc in Brazil, where it is causing a collapse of the health care system and led to at least 60,000 deaths in the month of March.

Second, SARS-CoV-2 variants of concern can also lead to more severe disease and increased hospitalizations and deaths. In other words, they may have enhanced virulence. Indeed, a recent study in England suggests that the B.1.1.7 variant causes more severe illness and mortality.

Another concern is that these new variants can escape the immunity elicited by natural infection or our current vaccination efforts. For example, antibodies from people who recovered after infection or who have received a vaccine may not be able to bind as efficiently to a new variant virus, resulting in reduced neutralization of that variant virus. This could lead to reinfections and lower the effectiveness of current monoclonal antibody treatments and vaccines.

Researchers are intensely investigating whether there will be reduced vaccine efficacy against these variants. While most vaccines seem to remain effective against the U.K. variant, one recent study showed that the AstraZeneca vaccine lacks efficacy in preventing mild to moderate COVID-19 due to the B.1.351 South African variant.

On the other hand, Pfizer recently announced data from a subset of volunteers in South Africa that supports high efficacy of its mRNA vaccine against the B.1.351 variant. Other encouraging news is that T-cell immune responses elicited by natural SARS-CoV-2 infection or mRNA vaccination recognize all three U.K., South Africa, and Brazil variants. This suggests that even with reduced neutralizing antibody activity, T-cell responses stimulated by vaccination or natural infection will provide a degree of protection against such variants.

STAY VIGILANT, AND GET VACCINATED

What does this all mean? While current vaccines may not prevent mild symptomatic COVID-19 caused by

these variants, they will likely prevent moderate and severe disease, and in particular hospitalizations and deaths. That is the good news.

However, it is imperative to assume that current SARS-CoV-2 variants will likely continue to evolve and adapt. In a recent survey of 77 epidemiologists from 28 countries, the majority believed that within a year current vaccines could need to be updated to better handle new variants, and that low vaccine coverage will likely facilitate the emergence of such variants.

What do we need to do? We need to keep doing what we have been doing: using masks, avoiding poorly ventilated areas, and practicing social distancing techniques to slow transmission and avert further waves driven by these new variants. We also need to vaccinate as many people in as many places and as soon as possible to reduce the number of cases and the likelihood for the virus to generate new variants and escape mutants. And for that, it is vital that public health officials, governments and nongovernmental organizations address vaccine hesitancy and equity both locally and globally. ●

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WHY BABY ANIMALS CAN WALK SO MUCH SOONER THAN HUMAN INFANTS

The early, shaky baby steps in many mammals stem from basic survival skills, while baby humans are prioritizing other biological needs.

By Leslie Nemo

Watching a newborn lamb or giraffe take its first steps can be simultaneously cute and painful. In these and other early-to-walk species — typically larger grazing animal — the wobbles are sweet, but the falls are hard. Limbs sometimes bend in ways that would mangle your own legs. “The first 24 to 48 hours, they’re still pretty awkward,” says Sarah Reed, an animal biologist at the University of Connecticut.

Once the early learning phase passes, a cow, horse or zebra less than one week old can literally run circles around human infants of the same age. Many large, grazing mammals develop this way. And though it might seem strange from our perspective, learning to walk — or more specifically, get out of harm's way — is one of the simplest survival strategies around. Truthfully, the fact that a human baby does so little for so long makes us the odd species out.

SPRINT TO SURVIVE

Those shaky first steps from a lamb or calf serve a purpose: To evade predators. “We see a lot of prey animals that are precocial, which means that they can stand and move fairly soon after birth,” Reed says.

For wild animals like zebras and giraffes that live in wide-open spaces, the only real defense they have against predators is to run. Forest-dwelling species can tuck their young into the foliage and trust that it will be safe without supervision for a while — that’s what mother deer do with fawns for days at a time. But savannas and grasslands offer minimal hiding spaces. The sooner a newborn can outrun a predator, the better their odds of survival. And though domesticated animals like cows aren’t often hoofing it to avoid being eaten, their wild ancestors likely did.

The ideal accommodations and conditions for early-walking animals typically starts in the womb. After gestation, these babies emerge with a higher percentage of bone and muscle making up their body weight, Reed says, so the baby has the equipment it needs to stand up. “If you look at a foal when it's born, it looks like skin and bones,” Reed says — hardly any fat and just the little amount of muscle development it needs to move limbs.

Wolf pups or tiger cubs look and behave a lot different a few days after birth. Atop the food chain, these predators can take a more leisurely pace when it comes to growing up. They don’t have to worry about escaping another species’ claws. In these animals, it takes time for newborns to open their eyes, let alone walk. Animals that hunt other animals typically require more time to develop coordination and motor skills, abilities they need to protect themselves and capture their food.

BRAINS OVER BIRTH SIZE

Humans are born with capabilities and characteristics that look the most different from what we become as we mature. “Personally, maybe it’s the anthropologist in me coming out — we are very much mammal, but we’re also kind of a very weird mammal,” says Teresa Steele, a paleoanthropologist at the University of California, Davis. “Our babies are born exceptionally underdeveloped.”

Like in other mammals, all the muscle cells we’ll ever have are present when we are born. The cells, which stretch the length of every individual muscle they are in, only grow wider and longer as we age. But in other ways, human infants are drastically different.

A full 15 percent of a human baby’s body weight is fat — a higher percentage than in any other species. When we are born, the shafts of our longer bones hold a lot of soft, flexible cartilage, and many joints are separated. Even the different bones that make up our skull have yet to fuse together.

Similar to other species' need to stand right away, our inability to do much at all as newborns is a byproduct of other biological needs. For one, we move around on two legs with our hands free to hold tools, something not all our ancestors can claim. Our hips are narrower than in other primates to keep us from waddling side to side while walking. At the same time, we have big brains: Our organ is about seven times bigger than it is in other similarly-sized animals.

In theory, we could use a wider pelvis to make birthing that large head easier. But walking pressures our hips to stay narrower. A less-developed baby meets both demands, Steele says. “The compromise between a narrow birth canal and a big-brained baby is to have the babies early.” Our bodies go one step further to ease childbirth by keeping infant skeletons slightly squishier and more flexible so they can squeeze through the delivery process. “You don't want a mineralized skull when that happens, thank goodness,” Steele says. “As a mom, that would be terrible.”

Coming out of the womb underdeveloped compared to other species means we spend years with parents and people who help raise us. “One of the trade-offs is we have this amazing capacity to to learn and innovate,” Steele says.

Depending on adults for many years gives us that much more time to put those larger brains to work, figuring out not just how to move, but eventually developing the skills necessary to tame other species and sit around wondering why they can walk so early — something those animals will never do, no matter how old they are. ●

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DRONES COULD HELP FARMERS KEEP A WATCHFUL EYE ON CROP HEALTH

By Patrick Skahill

On a farm in South Glastonbury, a tractor idles. It's one of the most iconic farming inventions of the late 19th century, a tool that was invented shortly before Donald Preli's grandfather came from Italy and started Belltown Hill Orchards.

Now, more than 100 years later, Preli said a much newer invention could revolutionize farming here: unmanned aerial vehicles, or "drones."

"We only can see as we're looking down a row," Preli said. "This is flying over top ... "It's going to see trouble areas a lot quicker than we will."

Drone technology could be a new frontier for farmers looking to keep a watchful eye on the health of their crops by providing updates on plant health and saving farmers valuable time.

"With the drone technology, we're hoping that they can fly pretty much the whole farm in a couple hours," Preli said. "Report back on my cell phone, I'll look at it in the evening, and make adjustments the following day."

And while a ping on a farmer's cell phone is the end goal, drone technology still isn't quite there yet.

By a field of honey crisp apples, Nancy Marek, a Ph.D. student at UConn, tinkered with a drone before getting it ready to launch.

"Oops. See? There's a mission error," Marek said while gesturing to what she described with a laugh as a "finicky" device. "We're just gonna turn it off and turn it back on again."

With the drone rebooted and ready, Marek punched in a few inputs and the machine soared skyward.

It flew at about 160 feet, preloaded with a flight path by the UConn team. We looked up as the drone passed above the apples, and us, all the while, snapping hundreds of pictures of the crops.

But these aren't your typical photos.

Chandi Witharana, an assistant professor in residence at UConn, said the drone is equipped with a special sensor that peers into parts of the spectrum our eyes can see and parts of the spectrum that it can't.

"Including blue, green, red, near infrared and other bands," Witharana said. "Those channels tell us, or probe into, the biophysical characteristics of the crop."

But the trick is making sense of it.

"Anyone can deploy a drone. Acquire data. The real challenge is creating insights from the data," Witharana said.

To get those insights, researchers today are taking samples from the plants.

As he walked down a row of grapes, Evan Lentz, a second-year master's degree student at UConn, picked leaves and stuffed them into a baggie.

"You wanna take, roughly, a hundred leaves," Lentz said.

He'll send the leaves to a lab, which will look for nutrients like nitrogen, phosphorus, and potassium, to name just a few.

"Basically, we're getting this massive amount of data about what's going on in the plant and then eventually we try to tie that to the images from the drone," Lentz said.

And that's the big hurdle right now.

"The drone's not really telling us anything other than it's this color or I am capturing this wavelength," Lentz said. "Then it's up to me to sort through the field data from the tissue sample results and look for a relationship."

Lentz said there's still a lot he needs to learn about that relationship. But if the idea pays off and researchers develop a model to spot plant problems from the sky, he said it could reduce a lot of risks for farmers when it comes to "the cost of testing, crop loss, decreased yield, disease," Lentz said. "There's some pretty large possible impacts if we do get this up and running for farmers."

Donald Preli, who let UConn use his South Glastonbury farm to test out the drone idea, said he's excited by what the future holds for drones keeping a watchful eye on his crops.

"We'd love to own a drone that could do multiple tasks," Preli said. "Where we don't have to go out personally and do it. We can just send a drone, program it to do a certain row or a certain block. And when it comes back home, we know it's been done."

Because on a 200 acre farm, Preli said, it all comes down to humans and using their time most efficiently, possibly, with the help of a drone. ●

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WHY DO BEACHES CLOSE AFTER A STORM? THE ISSUE DATES BACK TO THE 1800S.

By Jordan Fenster

A heat wave came through Connecticut after Tropical Storm Henri, but residents found public beaches closed to swimming.

It took days after the storm for all public beaches to open up again, as it does after every major storm.

The reason beaches close after major storms, and sometimes in anticipation of major storms, is a problem that goes back to the 1800s that is costing Connecticut billions to fix.

"All of our big cities have a combined sewer system," said Mike Dietz, director of the Connecticut Institute of Water Resources at the University of Connecticut.

"There are discharge points where combined sewage and stormwater gets — raw sewage, now, not treated — gets discharged directly into our rivers or our estuaries," said Mike Dietz,

As Dietz explained, most sewage systems in our state were built in the 1800s when mixing stormwater with sewage was the right thing to do.

"The stormwater was put in there on purpose, basically to help keep that system flushed out and keep it moving to keep it clean," he said.

In New Haven, for example, some pipes in the system date back more than 150 years.

"Our earliest pipes were being put in the 1860s and 1870s," said Gary Zrelak, director of operations for the Greater New Haven Water Pollution Control Authority.

Since then things have changed, according to Zrelak. Stormwater and sewage are separate systems, but in a big enough storm, there is overflow and all of it gets dumped into the Long Island Sound.

In New Haven, Zrelak explained that the area's sewage treatment facilities can handle regular rainfall. A storm that drops 2 inches over 48 hours might be no problem. But during a storm like tropical storm Henri, there might be 2 inches of rain in four hours. That can cause a combined sewer overflow.

"The rainfall issue is really about intensity," he said. New Haven's sewage treatment facility handles about 30 million gallons a day. "We'll go up to 100 million gallons a day during a rain event," Zrelak said.

'EFFLUENCE'

The question is the amount of toxins, specifically bacteria, that get dumped into local waterways from combined sewage overflow events. The amount of allowable toxins depends on the specific use of the waterway, said Traci Iott, a supervising environmental analyst at the state Department of Energy and Environmental Protection explained.

Beaches get closed, she said, when "there's data that indicates that the bacteria levels are higher than the criteria that we have, that are set to be safe for public health for swimming. So, if we have bacteria data, and it's higher than that, then we'll generally close the

beach until we can go back and retest, and make sure everything's good."

It can even happen before any testing for bacteria, as state Department of Health toxicologist Stewart Chute explained by email: "Rainfall amounts in excess of a threshold (generally two inches/24 hours) can also, under the authority of the local health director, also close a beach. This is an example of a 'preemptive closure.'"

The state Department of Energy and Environmental Protection oversees state beaches in coordination with the state Department of Public Health. Municipal beaches are overseen by local municipalities, with the U.S. Environmental Protection Agency setting the levels of bacteria in the water considered acceptable.

Bacteria are measured by the number of "colony forming units" per 100 milliliters of water.

A state or municipal employee will take a sample of water and, if the levels exceed 235 cfu of fecal coliform bacteria per 100 milliliters of freshwater, or 104 cfu of enterococci bacteria per 100 milliliters of marine water, then the beach is closed to swimming.

Sewage overflow is not the only reason beaches get closed. There are at least six conditions that will force a beach closure, including regular rainfall. Stormwater has to go somewhere.

"We're talking about the roads, parking lots, driveways, rooftops, everything that basically water cannot pass through, water sheds off of those surfaces, and is most of the time directed into a stormwater system, a separate stormwater system, where it goes directly into the local waterway untreated," Dietz said.

Lott said it depends on how far a source of contamination, say a large concentration of bird excrement, is from a water source.

"We've got a lot of hard surfaces in Connecticut," she said "So, when you have rain that falls on a hard surface, then whatever it picks up, it's got a straight line to a water body."

When asked if we are ever swimming in clean water, Dietz explained that it was more complicated than a yes or no question. He said there are naturally occurring toxins that would get flushed into the Sound even if there were no people at all.

"Clean is a relative term," he said. "These natural waters are never going to be free of bacteria. Bacteria is a naturally occurring thing in any water."

BILLION-DOLLAR PROJECTS

Managing water, both sewage and rainfall from larger and smaller storms, has been an ongoing issue for decades.

"When they first started this in the 80s, they started separating pipes," Zrelak said. "When we started getting into the 90s, people started shying away from that."

Other projects have attempted to build storage tanks to hold excess water from combined sewage overflow events until it can be safely handled.

"We've tried some of that, but it gets very expensive," Zrelak said.

Water mitigation plans are not single projects but layered, involving separating pipes, upgrading sewage treatment facilities, pump stations and other pieces of infrastructure.

Greater New Haven's plan, the "Bible," as Zrelak called it, calls for \$400 million to be spent over 15 years, and there are similar projects in many Connecticut cities.

For example there are at least seven such projects in West Haven. Two current combined sewer overflow projects in Bridgeport totaling \$9 million, several pump station upgrades in Fairfield, plus similar ongoing projects in New Hartford, Torrington, Ridgefield and many other places.

The largest such project in Connecticut, in fact the largest such project in the Northeast, is in Hartford.

Nick Salemi, spokesperson for the Metropolitan District, the greater Hartford water pollution control authority, said they have managed to cut the number of combined sewage overflow events in half.

"That series of projects has cost \$1.6 billion so far over the last 15 years," and it's nowhere near complete.

"There's still another phase of the project yet to be approved and started," he said, and that is just for "stormwater separation."

"There's a pipe in the ground that has both stormwater and sewage in Hartford," Salemi said. "They have a

project called sewer separation, dig up the ground, dig up the street, fix the old pipe and put in a new one. Now there's one dedicated for sewer, there's one dedicated for stormwater."

BUT ... IS IT SAFE TO SWIM?

If the issue is what Iott called "effluence," either untreated human sewage or bacteria from animal and natural sources, is it ever safe to swim in the Long Island Sound? The answer is yes, though it depends on where and when. Iott said she often enjoys beaches with her family.

"If I was in Hartford, I probably wouldn't go swimming in the Connecticut River when there's a combined sewer overflow," she said. "But on any given day? Absolutely. I go down with my family to the beach, go to the rivers, and so on."

Zrylak said he has been using the sound to fish and boat his entire life. "I kayak, I fish a lot," he said, though he believes the water quality has gotten much better over the years.

Still, "There's concern, there's areas you shouldn't go," he said. "I wouldn't go clamming in the inner harbor in New Haven." As for Dietz, he said, yes, he does and will continue to swim in the Long Island Sound, but not always.

"Not right after a hurricane, I wouldn't," he said. ●

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UConn TEAM TO STUDY NATIONAL IMPACTS OF EMERGING WATER POLLUTANTS

By John Moritz

Researchers at the University of Connecticut's Avery Point campus said Tuesday they will embark on a multi-state effort to gain a better understanding of emergent

contaminants in the nation's water, with the backing of a new \$850,000 federal grant.

The grant was announced this week by the National Sea Grant office, and will be split between Sea Grant programs in Connecticut, New Hampshire and North Carolina. The Connecticut Sea Grant program is based at Avery Point.

Sylvain De Guise, director of the Connecticut Sea Grant Program, said the purpose of the study will be to examine the polluting effects of contaminants of emerging concern, or CECs, which he said included chemicals, cleaning products and pharmaceuticals that were developed to replace older products that became phased-out due to known concerns over their harmful effects on the environment.

"There's a whole new class of chemicals that we know very little about," De Guise said.

One example of CECs that have attracted recent interest in Connecticut are a group of chemicals known as per- and polyfluorinated alkyl substances, or PFAS, which were marketed for decades for use in firefighting foams before a series of high-profile spills along the Farmington River led to greater scrutiny of their use.

State lawmakers passed a wide-ranging ban on PFAS chemicals this year, and the Department of Energy and Environmental Protection plans to inspect thousands of wells in the state for potential contamination.

"They were brought into the market or brought into use before we understood their toxicity, their life cycle, how long they take to break down in the environment," De Guise said, referring to PFAS and other CECs.

In a statement announcing the grant on Monday, National Sea Grant College Program Director Jonathan Pennock said the effort will also help develop longer-term strategies across the national network of 34 Sea Grant universities to combat pollution and CECs.

"Sea Grant's latest investments demonstrate our commitment to address knowledge gaps to improve the management of freshwater resources at the interface of both coastal and Great Lakes environments," Pennock said.

In the first phase of their partnership, De Guise said researchers at UConn will work with their partners in New Hampshire and North Carolina on a "scoping

exercise” that will seek input from experts, regulators and non-governmental organizations to find gaps in the existing understanding of CECs.

For example, De Guise said, if the researchers find that ample lab studies on CECs have not not been backed up by field work, then the researchers will focus their efforts there, or visa versa. The project will also examine possibilities for public outreach over individual efforts to reduce the use CECs that pollute the environment.

The goal will be to “find the sweet spot that will return the biggest return on investment for our research dollars,” De Guise said.

The initial “scoping” phase of the project will take one year, De Guise said, and will be followed by two years of research work by the Sea Grant programs. At least three staff members at UConn Avery Point, led by De Guise, will work on the project during that time. ●

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THE COLD-WEATHER RUNNING GEAR YOU NEED THIS WINTER

By Ingrid Skjong

Running in the cold, whether you consider it invigorating or torturous, takes guts—and preparation.

“It makes me feel like a badass,” said Minnesota-based Verna Volker, founder of Native Women Running. “I grew up in the southwest and never thought I would ever run in Minnesota winters, but I am hooked.”

Mild temperatures of 55 to 60 degrees Fahrenheit allow for the most efficient transfer of heat out of the body, wilderness-medicine expert Dr. Richard Ingebretsen told us—which explains why that range often feels so terrific to run in. (Research on the relationship between air temperature and marathon performance, however, has found wider optimum spans.) But as temperatures drop, and as heat loss accelerates, the body can’t compensate fast enough. Dressing strategically can

mean the difference between embracing outdoor winter exercise and sticking with the treadmill.

We consulted Volker, Ingebretsen, and five other experts for their tips on dressing for comfort, safety, and—possibly—bragging rights. Layering warm, breathable pieces (in general, no more than three) is key to helping the body regulate heat as temperatures dip. But it’s also possible to overdress even in the coldest of conditions. Choose clothing that vents or that you can easily shed mid-run and then close up or put back on when you’re done, the pros told us.

BASE LAYER: STAY DRY ON THE INSIDE

Moisture is one of the easiest ways to lose too much heat, said Ingebretsen. To help pull sweat away from your skin, start with a base layer made of a breathable, quick-drying fabric (we have several good options in our thermal underwear guide). Merino wool, polyester, nylon, and Lycra work well. Cotton does not, since the material absorbs moisture but doesn’t wick it away.

The Icebreaker BodyFitZone Merino 260 Zone Long Sleeve Crewe (women’s, men’s), our favorite base layer for high-output aerobic exercise, is built to offload heat as you work and to preserve it when you’re done. Pieced together with differently weighted fabrics, it’s more protective in places exposed most often to the cold (shoulders) and lighter in areas that give off heat (armpits). Keep in mind that any well-fitting shirt made of a wicking fabric will do; for morning winter runs in New York City, I often wear one of the long-sleeve, technical-fabric T-shirts I’ve accumulated from past races.

SECOND LAYER: PRESERVE HEAT

For a second layer, choose a piece that’s soft, cozy, and insulating. “You want something with loft—a layer that traps heat,” explained Dan Fitzgerald, co-founder and president of running-apparel store Heartbreak Hill Running Company in Boston and Chicago.

The appropriate heft of this second layer depends on the temperature outside. Fitzgerald suggests a fleece item or a half-zip. (I like the New Balance Thermal Half Zip (women’s, men’s), which has textured microfleece on the inside and a slightly relaxed fit.)

If you're as warm as toast before you run a single step, you might be overdressed.

Don't overdo it here, though. Your body produces heat as you exercise. If you're overdressed—particularly in layers that don't breathe or wick well—you may find yourself damp and chilled by the end of your run. A rule of thumb: If you feel a bit chilly when you step outside and begin to warm up, you've most likely layered right. If you're as warm as toast before you run a single step, you might be overdressed.

OUTER LAYER: REPEL THE ELEMENTS

To top things off, you need a protective shell, one that keeps the elements from penetrating your loft layer. This can be anything from a light windbreaker to a fully insulated jacket—again, depending on the conditions. In our guide to lightweight windbreakers, we recommend the Arc'teryx Squamish Hoody (women's, men's) for its durability, breathability, and extra-warm windproofing. I typically choose an older-model, water-resistant windbreaker, but I also like the Nathan Traverse Jacket, which has a softer, slightly stretchy feel and is water resistant, with back vents that help excess heat escape. (The same company also makes two of our favorite running belts.)

A vest, which keeps your torso warm and your arms free to cool, is another option. Wirecutter senior staff writer Chris Heinonen, an experienced runner who lives in Portland, Oregon, likes the Smartwool Men's Merino Sport Ultra Light Vest, which he says does well in wind and rain.

FOR THE REST OF YOUR BODY: MINIMIZE EXPOSURE

Bare skin not only loses heat but is also susceptible to damage from exposure. "In really cold weather you want to make sure you protect all the points that are prone to cold injuries, like ears, nose, cheeks, and fingers," said Rebecca Stearns, a certified athletic trainer and chief operating officer of the Korey Stringer Institute at the University of Connecticut's kinesiology department. Verna Volker relies on a neck warmer that covers her face (she likes the Midweight Merino Wool Multifunctional Headwear by Buff). A breathable hat that covers your ears will work for your head.

A simple glove helps keep fingers warm. The merino-wool Smartwool Liner Gloves are sweat-wicking and odor-resistant, have excellent touchscreen sensitivity, and can layer with a mitten in colder temps. For a softer feel (but less touchscreen accuracy), try the wool Arc'teryx Gothic Gloves. We've also had good runs with WhitePaws Wind and Water Resistant RunMitts; essentially a thumbless mitten, they keep all digits close (and therefore warm) and feature a slot for a hand warmer if you desire. If you heat up, you can open the top of the mitt to expose your fingers or even push the gloves down to your wrists.

When it comes to your legs, one layer is enough on most cold days, said Dan Fitzgerald. A pair of regular full-length workout leggings will likely offer ample coverage and support. For especially cold days, we like the Sugoi Women's MidZero Tights for their flattering fit and warmth. Chris Heinonen also likes the Smartwool Merino Sport Fleece Wind Tights, which have a windproof front panel and aren't too hot.

For Your Feet: Consider Traction

Don Kiely, a 28-year resident of interior and northern Alaska and webmaster of Running Club North in Fairbanks, Alaska, has run in temperatures as cold as -49 degrees Fahrenheit and is a fan of waterproof Icebug running shoes, which also have built-in studs for traction. "I wouldn't survive the winter without them," he said, noting that their only downside is that they're a bit stiffer than regular running shoes.

If an all-in-one shoe for ice is a step too far, but slippery terrain is a concern for you, consider a nonslip traction device that you can wear with your regular running shoes. The Kahtoola NANOspikes, our favorite traction device for road running, are lightweight and have 10 tungsten-carbide spikes per cleat that can confidently handle black ice and mixed snow on roadways. The spikes are short and lighter underfoot than the chains or steel spikes used on devices meant for rougher terrain.

If cold feet bother you on the run, consider covering your shoes, said Sarah Ahlers McInerney, executive director of Run Minnesota. She suggests a DIY approach: using duct tape on the tops of your shoes to block wind and water.

For Your Safety: Be Seen

Late sunrises and quickly fading daylight can make for dark runs. Our favorite piece of reflective running gear is the Amphipod Xinglet Vest, a pick for its reflectivity and adjustability (we also like that it doesn't require washing after use, as a reflective shirt would). It's easy to move in thanks to its spare design, and it's visible from all angles. If you're after even more visibility, consider a head lamp: For runners, we recommend the lightweight and comfortable Black Diamond Sprinter 275 with its 275-lumen front light and rear blinker. ●

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WILL SUPPLY SHORTAGES IMPACT THANKSGIVING? EXPERTS SAY NO, BUT CONCERN HAS INCREASED INTEREST IN LOCAL TURKEYS

By Susan Dunne

With staffing and pandemic-related issues leaving grocery store shelves sporadically empty and favorite products unreliably available from week to week, some consumers began to wonder whether turkeys and other Thanksgiving staples would be in short supply for the upcoming holiday.

Local farmers, food-industry representatives and restaurateurs say not to worry. Thanksgiving should go off without a hitch.

"We do not anticipate a shortage of turkeys at the holidays. There will be turkey products available," said Sarah Little of the North American Meat Institute, a trade association that represents 70 percent of turkey product in the country. "Consumers should plan ahead and may need to be flexible depending on when and where they shop if they are looking for a specific size or cut."

Jim Dudlicek of the National Grocers Association, which represents independent grocers nationwide, agrees that in this unpredictable year, planning ahead is a wise strategy, especially with food items that can be bought well in advance of the holiday.

"There's plenty of food in the supply chain, but certain items may be harder to get at certain times," Dudlicek said. "Consumers should secure those 'must haves' in a timely fashion to ensure favorites for the holiday table, but be mindful of their neighbors and limit their quantities to only what they need."

The coronavirus pandemic stymied large Thanksgiving gatherings in 2020. This year, the health crisis seems to be on the wane, with vaccination percentages up, infection rates down and mask mandates largely lifted in Connecticut. Holiday gatherings are expected to return.

Still, a byproduct of the pandemic — the supply-chain crisis that has slowed down delivery systems worldwide — is making many products hard to find at times in grocery stores, or more expensive than consumers expect.

"COVID-19 has contributed to increased costs at nearly every stage of the food supply chain, from the farmers and ranchers who produce food, to the manufacturers who turn raw commodities into the products sold in Connecticut supermarkets, to the grocers who provide those foods to communities and families," said Wayne Pesce of Connecticut Food Association.

For those interested in bypassing the question of what's available at the grocery store, turkeys raised on Connecticut farms are another option. Locally farmed turkeys are a small percentage of turkeys sold, compared to frozen supermarket mass-market turkeys, but have been in demand this year due to supply concerns.

"Farm-raised turkeys, especially locally, are going to cost you a little bit more than the grocery store because they have a different quality of life, the way they are treated and raised. Often, they are out on pasture instead of being confined. They have a varied diet rather than being fed fatty diets meant just to bulk them up," said Rebecca Toms of UConn Extension and Buy CT Grown.

The state's smaller farms, which produce a few dozen turkeys every year, have sold out. But some larger farms still have turkeys left.

Miller Farms in Avon which works with many family farms, still has hundreds of turkeys available. Those who buy turkeys from Miller Farms have the added satisfaction of donating to people experiencing food insecurity, through its Thankful Turkey program.

"For every turkey purchased, one is donated to a family in need through Connecticut Foodshare, our food bank partner," said Taryn Miller-Stevens of Miller Farms. "Last year we sold out, donated 2,500-plus turkeys, impacted 50,000-plus lives through the program."

Gozzi Farm in Guilford still has hundreds left, but "we're running out quick," said farmer Bill Gozzi.

FOOD & DRINK NEWSLETTER

"People started ordering really early this year. Generally we see a couple of people trickle in in October. It started in September this year, because of the panic that there's going to be a shortage. But we're the same as we always are. We always raise the same amount of turkeys."

Ekonk Hill Turkey Farm in Moosup, which sells about 4,000 each year, still has a couple hundred turkeys for sale.

Those who still can't find a turkey, or who would prefer to leave the cooking to the gourmets, can place a takeout order with any of several local restaurants doing turkey takeout. Restaurants have cut-off dates for ordering. Check their websites.

Gozzi said people are eager for the holiday in 2021, because many celebrations were canceled in 2020.

"People want to have a Thanksgiving. They want to gather. They're tired of this. Everyone is," he said. ●

NINE TYPES OF WILD ANIMALS AND INSECTS THAT CAN HELP YOUR GARDEN FLOURISH

Everything from birds and bees to frogs and owls can keep the pest population down, giving your favorite plants and flowers a better chance of growing tall.

By **Nashia Baker**

Looking to natural pesticides or fertilizers may be your first instinct when it comes to keeping pests out of your garden, but it's not your only option. As it turns out, wild animals can actually be of service in that outdoor space. Not only are common animals like birds, frogs, and owls that already make their way to your garden helpful at keeping bugs at bay, but other wild animals (that may seem like pests themselves), such as snakes and bats, are also doing important things for your plants. Here, wildlife and garden experts explain all of the most popular animals out in Mother Nature that can help your garden thrive.

BIRDS

Pamm Cooper, an extension educator at the University of Connecticut Home and Garden Education Center, says birds are beneficial to any garden or landscape for one big reason: pest control. "Insect pests of landscape plants, like caterpillars and sawflies, are eaten by adult birds and their young," she says. "To encourage birds already there or attract other species, use plants that will provide food, shelter and nesting sites. Water can be provided by birdbaths placed near shrubs or trees."

BEES

When thinking about wild animals that can help your garden, also consider the bees. "Pollinators ensure pollination of wild and cultivated plants-flowers, trees, fruit shrubs, and vegetables that will provides seeds and fruits for wildlife and people later in the year," notes

Cooper. "For native bees, nesting sites, whether in plants, bare soil, holes or other places, may attract species to a property." She shares that if native bees are already on your property, then they likely have a suitable nesting site. A trick to get more bees in your garden? Tracy Rittenhouse, an associate professor at the University of Connecticut Department of Natural Resources and the Environment and the director of the Wildlife and Fisheries Conservation Center, says that she plants native flowers around her yard to attract a diversity of bees.

TOADS AND TREE FROGS

Keep the bugs at bay at night with the help of toads and tree frogs, as these animals are known to eat most insect species after dusk. "In my gardens and landscapes, I typically find tree frogs almost anywhere during the day, plus I have many toads of all sizes that can help with certain pests like mosquitoes, gnats, and other nuisance insects," says Cooper.

SYRPHID FLIES

"Syrphid flies and long-legged flies are great at controlling aphids and gnats, respectively, and lacewing larva and lady beetles consume aphids, sawflies, and other soft-bodied insect pests," explains Cooper.

BATS

While bats may seem like more of a pest, they can do wonders for a garden. "I love seeing bats flying outside of my house, because their presence tells me that there are native flying insects that the bats are foraging on," says Rittenhouse. "Late July and August is when young bats are learning to catch and eat flying insects." Cooper adds that bats are especially helpful by feeding on moths at night.

SNAKES

Corn snakes, black racer snakes, and brown snakes are all non-venomous and often found in yards and gardens to keep rat and rodent populations down.

OWLS

As owls are great night hunters of voles, mice, and other rodents, keeping your garden and surrounding

yard free of excess lighting will help them seek their prey. "Owls hunt in silence and in the dark. A brightly lit yards means that mice are more likely to see owls coming and can more easily escape," says Gregory A. Smith, Ph.D., associate professor of biological sciences at Kent State University.

CERTAIN BEETLES AND BUGS

Carabidae beetles, which are omnivorous, eat other arthropods, including slugs, snails, grubs, and wireworms. Additionally, some species feed on weed seeds. "The Eastern-eyed click beetle larvae are unusual in that unlike most click beetles whose larvae are pests, the eyed click beetle larvae are predatory and feed on the larvae of borers," she explains, noting that other bugs can feed on pests in the garden, too. "Anchor bugs, assassin bugs, and predatory stink bugs also feed on other insects, like caterpillars and sawfly larvae." While they go formally by the name fireflies, these lightning bugs are actually beetles that have larvae that feeds on other insect larvae. Plus, they eat snails and slugs that could be taking over your garden. "Some beetles, like flower beetles, visit flowers for pollen and in the process of tramping about, [they] pollinate them," adds Cooper.

BUTTERFLIES

"Butterflies are pollinators of flowers, and the Eastern pine elfin and spring azure pollinate wild blueberry and huckleberry," says Cooper. "Butterflies also visit flowers or black cherry and other woody plants and pollinate these flowers as well, although not as effectively as bees." ●

College of Engineering

TRAFFIC IS DOWN ON AMERICAN HIGHWAYS DURING THE PANDEMIC, BUT VEHICLE DEATHS ARE UP – HERE'S HOW TO STAY SAFE ON THE ROAD

By Eric Jackson and Marisa Auguste

Although there are fewer cars on America's roads since the pandemic began, the number of fatal car crashes has increased.

Early nationwide data supports this counterintuitive finding: Although daily trips from households fell by as much as 35% in 2020, preliminary traffic fatality count data for the first nine months of 2020 shows 28,190 people died in motor vehicle traffic crashes - a 4.6% increase compared with the same period in 2019. The same trend has been reported in countries outside the U.S., such as Australia, where less traffic has not produced fewer road deaths.

Curious about traffic crashes during the pandemic, we decided to use our skills as a social scientist and a research engineer who study vehicle crash data to see what we could learn about Connecticut's traffic deaths when the stay-at-home orders first went into place last March.

A partnership between the Department of Connecticut discovered what many people intuitively knew: Traffic volume and multivehicle crashes fell significantly during the stay-at-home order. Statewide, daily vehicle traffic fell by 43% during the stay-at-home order compared to earlier in the year, while mean daily counts of multivehicle crashes decreased from 209 before the stay-at-home order to 80 during lockdown.

What was unexpected, however, was the significant increase in single-vehicle crashes, especially fatal ones. During the stay-at-home period, the incidence rate of fatal single-vehicle crashes increased 4.1 times, while the rate of total single-vehicle crashes was also up significantly.

Data about all crash types in the state, whether single- or multivehicle, tell a similar story. Although preliminary, police reports have placed the 2020 year-end total for traffic deaths at 308, a 24% increase from 2019.

It is unclear exactly why this is happening, but we are using data to investigate a few theories.

Data show that drivers are more likely to be speeding. Although traffic volume on Route 15 and Interstate 95 in Connecticut fell 52% in April 2020, the number of vehicles going more than 80 mph increased by 94%. Other states are seeing the same trends.

Drivers also appear to be very distracted. Data collected by Zendrive, a company that tracks smartphone data to predict drivers' behavior, shows that in 57% of crashes nationwide in 2020, drivers were on their phones. From January (pre-lockdown) to March 2020, drivers in crashes spent 7% more time on their phones; when that data collection was extended to November, drivers checked their phones 17% more often. These trends are also holding up in other countries.

American drivers are also being riskier on the road: According to the National Highway Traffic Safety Administration, the percentage of injured road users – drivers, pedestrians, bicyclists – with alcohol, marijuana or opioids in their system all increased during the pandemic.

Any death during COVID-19 – whether it's the direct result of the virus or its indirect effects on daily life – is a tragedy. Yet there are ways to keep drivers safe during this tumultuous period.

CHECK YOUR SPEED

Fewer drivers does not make speeding less dangerous. In 2010, more than one-third of fatal crashes took place on local rural roads that tend to have relatively few cars – and nearly one-third of those crashes involved speeding.

In normal conditions, drivers often “go with the flow” of traffic, matching the speed of other cars. Without other cars around, it may be easy to unconsciously go much faster. Frequent speedometer checks can help combat this.

Setting cruise control to the speed limit – or, at most, five mph above – will lock in your speed and save you from having to check the speedometer.

DON'T DRIVE ANGRY

In addition, if you're upset, try to avoid getting behind the wheel. The COVID-19 pandemic has left many feeling isolated, agitated or simply bored – but people who are feeling aggressive or angry are more likely to engage in unsafe driving. If you're in a heightened emotional state, ask a friend or family member to drive, use public transit or ride-sharing services, take a walk, ride a bike or simply stay home.

Last, stay focused. With fewer vehicles on the road, it may also seem safer than usual to sneak a peek at your phone. That's not the case, as the rise in phone use and fatal crashes during 2020 illustrates. To reduce the temptation of checking your phone, many free apps, such as Drivemode and Android Auto, simplify phone functions like GPS and music to minimize distractions. ●

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TRAFFIC IS DOWN ON TARGETING TUMORS WITH NANOWORMS

By Aaron Dubrow

Drugs and vaccines circulate through the vascular system reacting according to their chemical and structural nature. In some cases, they are intended to diffuse. In other cases, like cancer treatments, the intended target is highly localized. The effectiveness of a medicine —and how much is needed and the side effects it causes —are a function of how well it can reach its target.

"A lot of medicines involve intravenous injections of drug carriers," said Ying Li, an assistant professor of mechanical engineering at the University of Connecticut. "We want them to be able to circulate and find the right place at the right time and to release the

right amount of drugs to safely protect us. If you make mistakes, there can be terrible side effects."

Li studies nanomedicines and how they can be designed to work more efficiently. Nanomedicine involves the use of nanoscale materials, such as biocompatible nanoparticles and nanorobots, for diagnosis, delivery, sensing or actuation purposes in a living organism. His work harnesses the power of supercomputers to simulate the dynamics of nanodrugs in the blood stream, design new forms of nanoparticles, and find ways to control them.

Over the last decade, with support from the National Science Foundation, Li and his team have investigated many key aspects of nanomedicines, pioneering methods to model their flow and how they interact with structures within the body.

"My research is centered on how to build high-fidelity, high-performance computing platforms to understand the complicated behaviors of these materials and the biological systems down to the nanoscale," he said.

"I'm a 100% computational person, there's no dirty hands," Li said. "Because of the size of these particles, this problem is very hard to study using experiments."

Writing in *Soft Matter* in January 2021, Li described the results of a study that looked at how nanoparticles of various sizes and shapes—including nanoworms—move in blood vessels of different geometries, mimicking the constricted microvasculature. Nanoworms are long, thin, engineered encapsulations of drug contents.

"We found that the transport of these nanoworms is dominated by red blood cells," which make up 40% to 50% of the flow, Li explained. "It's like driving on the highway—construction slows down traffic. Drugs are getting carried by individual red blood cells and dragged into narrow regions and getting stuck."

He determined that nanoworms can travel more efficiently through the bloodstream, passing through blockages where spherical or flat shapes get stuck.

"The nanoworm moves like a snake. It can swim between red blood cells making it easier to escape tight spots," Li said.

Speed is of the essence—drugs must reach their destination before they are discovered and neutralized

by the body's immune system, which is always on the hunt for foreign particles.

The first nanoparticle-based treatment to be FDA approved for cancer was Doxil—a formulation of the chemotherapy agent doxorubicin. Many more are currently in development. However, a 2016 study in *Nature Reviews Materials* found only 0.7% of an administered nanoparticle dose is delivered to a solid tumor.

"We know that anti-cancer drug molecules are highly toxic," Li said. "If they don't go to the right place, they hurt a lot. We can reduce the dosage if we actively guide the delivery."

Red blood cell hitchhiking enhances the accumulation of nano- and micro-particles in the constriction of a stenosed microvessel. Credit: Sarah Shattuck and Dr. Huilin Ye

Tailor-made shapes are one way to improve the delivery of cancer drugs. (Currently, 90% of administered nanoparticles are spherical.) Another way is to coax drugs to their target.

Li's team has computationally modeled nanoparticles that can be manipulated with a magnetic field. In a 2018 paper in the *Proceedings of the Royal Society*, they showed that even a small magnetic force could nudge the nanoparticles out of the blood flow, leading to a far greater number of particles reaching the right destination.

Li's work is powered by the Frontera supercomputer at the Texas Advanced Computing Center (TACC), the ninth fastest in the world. Li was an early user of the system when it launched in 2019, and has used Frontera continuously since then to perform a variety of simulations.

"We're building high-fidelity computational models on Frontera to understand the transport behavior of nanoparticles and nanoworms to see how they circulate in blood flow," Li said. His largest models are more than 1,000 micrometers long and include thousands of red blood cells, totaling billions of independent ways that the system can move.

"Advanced cyberinfrastructure resources, such as Frontera, enable researchers to experiment with novel frameworks and build innovative models that, in this example, help us understand the human circulatory

system in a new way," said Manish Parashar, Director of the NSF Office for Advanced Cyberinfrastructure. "NSF supports Frontera as part of a broader ecosystem of cyberinfrastructure investments, including software and data analytics, that push the boundaries of science to yield insights with immediate application in our lives."

Frontera allows Li not only to run computational experiments, but also to develop a new computational framework that combines fluid dynamics and molecular dynamics.

Writing in *Computer Physics Communications* in 2020, he described OpenFSI: a highly efficient and portable fluid–structure simulation package based on the immersed-boundary method. The computational platform serves as a tool for the broader drug-design community and can be translated for many other engineering applications, such as additive manufacturing, chemical processing and underwater robotics.

"The current computational model covers many important processes, but the whole process is so complicated. If you consider a patient-specific vasculature network, that makes our computational model intractable," Li said.

He is taking advantage of artificial intelligence (AI) and machine learning to serve as a high-speed vehicle for the rapid generation of new nanoparticle designs and methods. Like all AI and machine learning, this approach requires massive quantities of data. In Li's case, the data is coming from simulations on Frontera.

"We're currently building the training database for the machine learning aspect of our work. We ran a lot of simulations with different scenarios to get broad training data," Li explained. "Then, we can pre-train the neural network using the hypothetical data we take from these simulations so they can quickly and efficiently predict the effects."

Li's typical simulations use 500 to 600 processors, though some aspects of the research requires up to 9,000 processors computing in parallel. "My research productivity is correlated with the speed of the system I use. Frontera has been fantastic."

When people picture medical research, they typically think of lab experiments or drug trials, but there are

limitations to this type of work, whether economic or physical, Li said.

"The computational approach is getting more powerful and more predictive," he said. "We should take advantage of computational simulations before we run very expensive experiments to rationalize the problem and provide better guidance." ●

THIS ARTICLE WAS FIRST PUBLISHED IN THE NEW YORK TIMES
ON MAY 27, 2021

CAN REMOVING HIGHWAYS FIX AMERICA'S CITIES?

By Nadja Popovich, Josh Williams, and Denise Lu

Built in the 1950s to speed suburban commuters to and from downtown, Rochester's Inner Loop destroyed hundreds of homes and businesses, replacing them with a broad, concrete trench that separated downtown from the rest of the city.

Now, the city is looking to repair the damage. It started by filling in a nearly-mile-long section of the sunken road, slowly stitching a neighborhood back together. Today, visitors of the Inner Loop's eastern segment would hardly know a highway once ran beneath their feet.

As midcentury highways reach the end of their life spans, cities across the country are having to choose whether to rebuild or reconsider them. And a growing number, like Rochester, are choosing to take them down.

In order to accommodate cars and commuters, many cities "basically destroyed themselves," said Norman Garrick, a professor at the University of Connecticut who studies how transportation projects have reshaped American cities.

"Rochester has shown what can be done in terms of reconnecting the city and restoring a sense of place," he said. "That's really the underlying goal of highway removal."

The project's successes and stumbling blocks provide lessons for other cities looking to retire some of their own aging highways. Nearly 30 cities nationwide are currently discussing some form of removal.

Some, like Syracuse and Detroit, have committed to replacing stretches of interstate with more connected, walkable neighborhoods. Others, like New Orleans and Dallas, are facing pressure from local residents and activists to address the pollution, noise and safety hazards brought by the mega-roads.

The growing movement has been energized by support from the Biden administration, which has made addressing racial justice and climate change, major themes in the debate over highway removal, central to its agenda.

In a wide-reaching infrastructure plan released at the end of March, President Biden proposed spending \$20 billion to help reconnect neighborhoods divided by highways. Congressional Democrats have translated the proposal into legislation that would provide funding over the next five years. And the Department of Transportation opened up separate grants that could help some cities get started.

Pete Buttigieg, who heads the department, has expressed support for removing barriers that divided Black and minority communities, saying that "there is racism physically built into some of our highways." Midcentury highway projects often targeted Black neighborhoods, destroying cultural and economic centers and bringing decades of environmental harm.

Congress is still haggling over Mr. Biden's infrastructure plan, but experts say the proposed funding for highway removal represents a shift in the way the government approaches transportation projects.

"As recently as a decade ago," said Peter D. Norton, a transportation historian at the University of Virginia, "every transportation problem was a problem to be solved with new roads." Now, the impacts of those roads are beginning to enter the equation.

TURNING A HIGHWAY BACK INTO A NEIGHBORHOOD

Federal and state funds have historically gone to building highways, not removing them. But in 2013, the city of Rochester, in upstate New York, won a nearly

\$18 million grant from the Obama administration that allowed it to take out an eastern segment of its sunken Inner Loop freeway, known locally as “the moat.” ●

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ON JUNE 22, 2021

BLACK PEOPLE ARE MORE LIKELY TO DIE IN TRAFFIC ACCIDENTS. COVID MADE IT WORSE.

More Black people died in traffic deaths in 2020 than any other racial group even though Americans drove less in the pandemic. Experts say this is not new.

By Char Adams

Black people represented the largest increase in traffic deaths last year than any other racial group, even as Americans drove less overall due to the pandemic, according to recently released data.

An estimated 38,680 people died in motor vehicle traffic crashes in 2020 — the largest projected number of deaths since 2007, according to the U.S. Department of Transportation’s National Highway Traffic Safety Administration. The number of Black people who died in such crashes was up 23 percent from 2019, the largest increase in traffic deaths among racial groups, according to the administration’s report.

Norman Garrick, a civil and environmental engineering professor at the University of Connecticut, said the numbers are saddening, but not surprising.

“Black people tend to be overrepresented as walkers in this country,” Garrick said. “This is not by choice. In many cases, Black folks cannot afford motor vehicles. And people that walk in this country tend to experience a much, much higher rate of traffic fatality. We’re talking eight to 10 times more. It’s a perfect storm of a lot of horrible forces.”

This most likely represents yet another way the health crisis has had an outside effect on Black people. Even in

the early days of the pandemic, the National Safety Council found that the emptier roads were proving to be more deadly, with a 14 percent jump in roadway deaths per miles driven in March. And Black people are more likely to face traffic injuries in general; from 2010-2019, Black pedestrians were 82 percent more likely to be hit by drivers, according to a 2021 report from Smart Growth America, a Washington, D.C.-based advocacy group focused on urban development.

Calvin Gladney, president of Smart Growth America, said the pandemic has only exacerbated the longstanding problem. He said there are three major reasons Black people bear the brunt of roadway injuries: infrastructure, design and racism. Predominantly Black neighborhoods are less likely to have crosswalks, warning signs and other safety mechanisms, he said. And many high-speed highways are in or go through communities of color, thanks to a federal effort in the 1950s to modernize the nation’s roadways.

“These fatalities have been going upward for a decade,” Gladney said. “You go to Black and brown communities, you go to lower-income communities and you don’t see many sidewalks. You don’t see as many pedestrian crossings. The types of streets that go through Black and brown neighborhoods are like mini highways where the speed limit is 35 or 45. You see this disproportionately in Black and brown communities often because of race-based decisions of the past.”

Little to no infrastructure funding means those in Black neighborhoods live with poor roads, dangerous proximity to waste sites, little access to public transportation and more. Along with the systemic nature of this problem, Gladney pointed out that social racism also plays a role in the rising number of traffic fatalities. A 2017 study from the University of Nevada found that drivers are less likely to slow down or stop for Black pedestrians than they are for white ones.

Gladney said that efforts like President Joe Biden’s proposed \$2 trillion American Jobs Plan, which includes efforts to make public transportation more accessible and improve road safety, are necessary, and that although the situation is dire “it’s fixable.”

He said small policy changes like lowering the speed limit in some areas could save hundreds of lives each year. Federal efforts like the 2021 Complete Streets Act

— introduced by Rep. Steve Cohen, D-Tenn. — would ensure public roads are safe and accessible for multiple modes of travel.

“The pandemic illuminated issues that people have been ignoring,” Gladney added. “These are the same streets and the same roads that have always been there. If we have intentionality to get to racial equity and close the disparities, we actually can fix this.” ●

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AUGUST 23, 2021

EXPERT: 20-YEAR STORMS WILL BECOME MORE FREQUENT

By Jordan Fenster

Tropical Storm Henri dumped as much as 5 inches of rain on some Connecticut communities, and one expert says the state should prepare for storms like this to hit more often.

A storm that drops 4.8 inches over a 24-hour period had been thought of as a one-in-20-year event, but Guilin Wang of the University of Connecticut said those extreme weather events will get progressively more extreme as the century progresses.

“It's going to become more frequent,” she said. “So, previously, it was a one-in-20-year event, but by mid-century, it's going to become a one-in-10 year event, or one-in-five-year event. So we are going to see those extreme events more frequently.”

Wang, a professor of environmental engineering, said that this is not new information.

“Theoretically, we knew that we are going to be looking at more intense precipitation,” she said.

What's new is the detail in global emissions data, allowing Wang and her colleagues to drill down to the state level and predict with some degree of confidence increased rainfall over the next 80 years in Connecticut.

What Wang found, and included in the Connecticut Climate Assessment Report produced by the

Connecticut Institute for Resilience & Climate Adaptation, is that extreme weather events will be both more extreme and more frequent.

“All indices representing the frequency or intensity of heavy precipitation are projected to increase for both mid-century and late century,” that report says.

“Extreme events of a given size are projected to occur more frequently in the future approximately three- to four-times as often during the mid-century and two- to three-times as often during the late-century.”

This means, as Wang explained, that a storm the size of which we might expect to see once every 20 years could happen as much as four times as often by the year 2050.

But a one-in-20-year storm does not mean those storms will happen every 20 years.

“The definition of one-in-20-year events should be the probability of that happening in any given year is 5 percent,” Wang said. “You could have one-in-20-year events every year for three years. You can calculate that probability. There is a probability for that to happen, and it's not that low.”

At the same time, Wang expects fewer wet days — more frequent and heavier storms, but fewer days of lighter rainfall. Given this, the average daily rainfall in Connecticut should not increase significantly, even as storms get worse and arrive more often.

On average, Connecticut sees 0.4 inches of rain every day. That should increase only about 10 percent by the middle of the century.

“The days with light rain might become lighter, and the days with the heavy rain will become heavier,” she said.

Theoretically, Connecticut and the rest of the Northeast could struggle with drought, as well as flooding.

“We are going to see more flooding, because the rain is going to become more intense,” Wang said. “And we are going to see more frequent and more intense drought, because precipitation is going to become further apart.”

“We are looking at increased drought risk and increased flooding risk at the same time,” she said.

As an environmental engineer, the question for Wang becomes whether or not Connecticut communities can

handle increasingly intense and increasingly common storms.

On average, the largest storms drop 2.8 inches of rain on Connecticut in any 24-hour period, but that doesn't mean the infrastructure of any given city or town can handle that much rain.

Municipalities, Wang said, need to ask specific questions, like "is this dam going to fail? Or is this channel that we designed for 20-year events, will it get flooded?"

Though she acknowledged there is significant work being done to prepare communities statewide for major storm events, when asked if the state has the infrastructure to handle 20-year storms every five years, Wang said. "Probably not yet." ●

THIS ARTICLE WAS FIRST PUBLISHED IN THE MOTHER JONES
ON SEPTEMBER 10, 2021

HURRICANE IDA LEFT A HUGE WATER CRISIS IN ITS WAKE

Hundreds of thousands of people still lack safe drinking water.

By Maria Paula Rubiano

It has been a week and a half since Hurricane Ida hit the Gulf Coast and the devastating impacts of the Category 4 storm are still being felt throughout the region. Some 418,000 people in Louisiana remain without power, unable to run air conditioning units to deal with scorching late summer temperatures or keep food fresh in homes and grocery stores. The storm has also forced hundreds of municipal water systems offline, creating a drinking water crisis that officials warn could last weeks.

As of Tuesday, 51 water systems across Louisiana, each serving between 25 to 20,000 people, remained shut down due to Ida. Another 242 remained under boil water advisories. Around 642,000 people remain without access to clean water, according to the Louisiana Department of Health. In Mississippi, the

state Department of Health has 10 active boiling water notices, affecting 7,142 people.

"There is no particular timeframe for all systems to come back up to 100 percent," Kevin Litter, a spokesperson for Louisiana Department of Health, said in an email. "This will be different for every system and also based on location."

The reasons for the immediate water crisis are two-fold: Across Louisiana and Mississippi, Hurricane Ida ripped down power lines, leaving water systems unable to get the electricity they needed to pump groundwater or to run treatment facilities. Even though Louisiana mandates that all water systems have backup, fuel-powered generators, many don't comply with the rule, Litter explained. Those who do have backup pumps are being affected by the extended blackout still crippling parts of the Gulf a week post-storm—a situation that has created fuel shortages that leave generators useless. Flooding on roads can also leave critical infrastructure, like water wells or pump stations, out of reach, making it impossible to fix storm damage. Lastly, the destruction of roads and bridges has literally ripped apart water pipelines, disrupting the whole system.

Intensified by climate change, Hurricane Ida is one of the strongest storms on record to hit the Gulf Coast. But the 150-mile-per-hour winds that took down electric lines, trees, and homes, as well as the powerful storm surge that briefly reversed the flow of the Mississippi River, can't fully explain the state's water systems failures.

Underlying the immediate devastation is the fact that Louisiana has one of the worst water systems in the country, which has left it vulnerable to storms like Ida. In 2017, the American Society of Civil Engineers, or ASCE, gave the state's drinking water system a D- in a recent infrastructure report card. "We have an antiquated water supply and water pumping system," Craig Colten, professor emeritus of geography at Louisiana State University and an expert on resilience, told Grist. "Our sewage treatment system is aged, and our infrastructure has not been maintained."

Nearly 60 percent of Louisiana's water systems—1,335—are more than half a century old. Most of these systems are chronically underfunded, according to the ASCE, creating threats to water quality. Just last year, 831 water systems (serving 606 communities) had 4,582

violations of water quality standards, according to the Louisiana Department of Health. National analyses from the Natural Resources Defense Council have found that drinking water systems in constant violation of the law are 40 percent more likely to serve populations with higher percentages of residents who are people of color.

Many of these violations come from the fact that small towns can no longer fund the maintenance and repair of their water systems, explained Colten. Especially in northern and central Louisiana, people have been moving away from rural towns into bigger cities. As a result, many of those communities have found themselves unable to provide public services for those who stay, forcing some neighborhoods to take care of the systems themselves, according to reporting from The Advocate. The lack of resources has led to a situation in which about 20 percent of the state's water systems are constantly violating the law, The Louisiana Illuminator reported earlier this year.

The pre-existing fragility of Louisiana's water systems creates a situation in which, as demonstrated last week, it doesn't take much to tip the scales from dysfunctional to full-blown shut downs. "It might be somewhat unrealistic to expect that systems that are serving 500 people or even the smallest systems, 25 people, would be resilient to a [hurricane like] Ida," said civil and environmental engineer Christine Kirchhoff, an associate professor at the University of Connecticut.

ROUGHLY 30 PERCENT OF STATE PARISHES ARE AT RISK OF SALTWATER INTRUSION INTO THEIR WELLS AND AQUIFERS.

But the problems go beyond power and pipelines. With rising sea levels, approximately 30 percent of the state parishes are at risk of saltwater entering the wells and aquifers where they source their water, according to ASCE's 2017 report card. The Investigative Reporting Workshop and WWNO/WRKF found that many aquifers in the state are shrinking fast, mainly because agriculture and oil and gas industries are over-pumping groundwater reserves.

Finding long-term solutions to the state's water woes will not be easy, but experts say funding is a must. Louisiana's drinking water infrastructure will need \$7 billion in additional funding over the next 20 years,

Karine Jean-Pierre, President Biden's deputy press secretary, said in May at a press briefing. The \$111 billion infrastructure bill recently approved in Congress will surely breathe some air into the asphyxiated finances of local water systems.

However, money to modernize infrastructure or buy backup generators for emergencies is not enough, said Kirchhoff. Part of what needs to happen, she said, is to have "a pool of staff who are available to these smaller systems to help them apply for funding or understand the regulatory changes, and be able to bring their system up to compliance."

Conservation and creating a water resource and management plan can also help. "We're a state that gets 60 inches of rainfall a year on the average, and we're expecting more rain, more moisture with climate change," Colten said. "There's plenty of water. Water availability isn't the issue." We need to invest in water systems that can handle this influx, he said. ●

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PARALLEL OPTICAL PROCESSING ENABLES HIGHEST THROUGHPUT MICROSCOPY IMAGING

By Joel Williams

A resolution-enhanced parallel-coded ptychography technique developed by researchers at the University of Connecticut has achieved the highest numerical aperture and throughput to date, compared to previous demonstrations of similar technology. The approach replaces the objective lens with a disorder-engineered surface.

"The disorder-engineered surface can be viewed as a computational lens," said Guoan Zheng, research leader and UConn professor of biomedical engineering. "The large-angle diffracted light from the object can be converted into smaller angles by the engineered

surface, thereby facilitating superresolution imaging beyond the limit imposed by the image sensor.”

Graphic representation of the parallel coded ptychography technique. The biospecimens are translated across the disorder-engineered surfaces on top of the image sensors for diffraction data acquisition. Courtesy of Guoan Zheng.

Graphic representation of the parallel-coded ptychography technique. The biospecimens are translated across the disorder-engineered surfaces on top of the image sensors for diffraction data acquisition. Courtesy of Guoan Zheng.

A conventional objective lens has an inherent trade-off between resolution and field of view. To achieve both high resolution and a wide field of view, one could increase the size of the lens. However, scaling up the lens would also scale up aberrations, requiring additional lenses for correction.

“The key advantage of the surface is the fabrication process,” Zheng told Photonics Media. Creating a metasurface with subwavelength scatters often requires electron beam lithography to define small patterns on photoresist.

“In contrast,” Zheng said, “a lithography-free fabrication process is developed to make the disorder-engineered surface in the prototype setup, enabling turnkey and scalable manufacturing at low cost.”

The scaling of complexity in array microscopy is a major obstacle preventing large-scale high-throughput imaging in biomedical applications, Zheng said. The prototype that he and his team developed is able to directly resolve the 308-nm linewidth on a resolution target without aperture synthesizing. It is able to acquire gigapixel high-resolution microscopic images with a 240-mm² effective field of view in just 15 seconds, with a corresponding image acquisition throughput higher than that of the fastest whole slide scanner in the world.

For conventional whole slide scanners, quick and precise autofocus is a challenge. However, for the coded ptychography technology, this can be done post-acquisition.

“After the complex lightwave from the object is recovered, one can digitally propagate the lightwave

back to any position along the axial direction,” Zheng said.

As such, autofocusing isn’t an issue.

“One limitation of this technology, perhaps, is the computational cost of the recovery process,” Zheng said. “To process a large-scale gigapixel image, it often takes 20 minutes or longer in the current implementation.”

Zheng doesn’t expect that problem to remain, however, due to increasing capabilities of graphics processing units.

The technology is expected to have wide-reaching applications, including in digital pathology, where it can be used to acquire high-resolution centimeter-scale field of view images for diagnosis.

In clinical applications, the technology can cut down diagnostic time considerably for medical procedures requiring culture growth-based assessment. “For example, the platform can be used for tuberculosis, staph, and other bacterial infection diagnoses,” Zheng said. “The device can continuously and autonomously monitor for growth changes and notify the user to examine the sample when changes have been detected.”

Conventional microscopy is not an optimal technique for monitoring bacterial growth; using an upright microscope requires removal of the petri dish cover to gain access to the cells. Inverted microscopes are often unable to image through the agar layer. With the coded ptychography technology, however, the intact petri dish can be placed directly on the disorder-engineered surface for image acquisition. ●

RECYCLED WATER CAN BOOST SUSTAINABLE AGRICULTURE — IF WE GET OVER THE ‘YUCK’ FACTOR

Our research found ways to overcome farmers’ concerns about the safety of recycled water

By Chesney McOmber and Christine Kirchoff

Delegates and activists from nearly 200 countries returned from the COP26 global environmental forum in Glasgow, Scotland, with a long list of climate-related promises and targets to discuss and implement. While many countries made a renewed commitment to climate-resilient and sustainable agricultural systems, some groups accused leaders at COP26 of not doing enough to improve water security globally.

The need for a climate-resilient food system — one that addresses both current and future climate threats, including water shortages — has never been more important. A recent alert from the United Nations, for example, warns about one of the world’s first climate change-induced famines in Madagascar. World Food Programme experts note that famine situations like this are just “the beginning of what we can expect” in the future.

WATER CONSERVATION HAS A GREATER ROLE TO PLAY

There’s also increasing pressure in the United States to build a more climate-resilient food system, in recognition of the threats to the food supply from climate change and environmental degradation. California’s persistent droughts, for instance, give water conservation methods new urgency — as the state’s massive agricultural industry accounts for 80 percent of California’s water usage.

Since agriculture accounts for 69 percent of water use globally and 36 percent of overall water use in the United States, policymakers are eager to reduce

freshwater demand. Boosting the use of recycled water within the U.S. agricultural sector might seem an obvious solution, but farmers — including greenhouse growers — have been reluctant to use recycled water. Why is that, given the urgent need for water conservation in agricultural production?

RECYCLED WATER SPARKS THE “YUCK FACTOR”

Scientists have long noted that both farmers and the general public tend to disapprove of recycled water — that’s because of a condition called the “yuck factor,” when people believe that recycled water is unsanitary. Would improved educational outreach overcome some of the hesitancy to reuse water, if people understood how recycled water works and why it’s safe to use?

General education efforts may not address the root causes of farmers’ resistance to using recycled water, our research explains. When scientists and policymakers talk about recycled water, they are referring to municipal treated wastewater — water that begins as sewage and transforms to recycled water through a highly regulated process at a wastewater treatment plant. Farmers don’t always think about recycled water the same way as scientists and policymakers, however.

In a recent article, our research team explored farmers’ knowledge about recycled water and how it might explain their resistance to adopting recycled water irrigation practices. Between spring 2019 and winter 2020, we surveyed 285 greenhouse growers across the United States to measure their knowledge, perceptions and willingness to use recycled water within greenhouse production.

We found that 73 percent of the respondents had not used recycled water. Most growers (83 percent) expressed an initial willingness to use recycled water on nonfood crops such as ornamental plants. However, their willingness dropped to 36 percent if recycled water could come in direct contact with food crops.

We then asked growers what they thought “recycled water” meant. The growers in our survey defined recycled water in terms of captured water (48 percent) such as harvesting rainwater runoff, treated wastewater from their own operations (26 percent), and recirculating systems like hydroponic irrigation (15 percent). These descriptions reflect the water-recycling

practices growers themselves follow — but only 10 respondents (3 percent) defined recycled water as municipal treated wastewater.

Our study shows that growers' perceptions of recycled water were greatly informed by their own experience with recycled water. Most growers who described recycled water as "captured water" or "recirculation" also viewed this water as contaminated with bacteria or viruses.

These findings suggest part of the reluctance to adopt recycled water in their greenhouse operations may be rooted in the different ways that farmers perceive that recycled water is produced and potentially unsafe. This gives important clues on how to tailor educational outreach to address these misunderstandings — and ultimately get more farmers to use recycled water.

TARGETED INFORMATION MAY HELP GET FARMERS ON BOARD

To be sure, this study explores recycled water knowledge among one subset of the agricultural sector: greenhouse growers. However, it's important to understand farmers' perspectives because their decisions about water use are important for food production — and longer-term resiliency to climate change.

Troubling climate projections suggest global freshwater supplies will come under increasing threat. In the United States, the need for greater water conservation is equally important. Our findings show that there is a disconnect between scientists, policymakers and the public around a general understanding of recycled water. If policymakers hope to get everyone on board with efforts to increase recycled water usage, investing in diverse and targeted informational outreach to broaden the understanding of climate resilience and emerging technologies will become even more important. ●

USA TODAY INVESTIGATION REVEALS A STUNNING SHIFT IN THE WAY RAIN FALLS IN AMERICA

By Nicole Carroll

Think your area has had more rain than usual? You're probably right.

Think your area has had less rain than usual? Again, you're probably right.

For our climate change investigation out this week, called Downpour, USA TODAY reporters used 126 years of monthly data from the National Oceanic and Atmospheric Administration to analyze average annual precipitation at 344 climate divisions. They used daily precipitation data from weather stations to measure the change in frequency of extreme rain events across the U.S. from 1951-2020.

"We were hearing a lot about extreme rainfall, stories of flooding, people with sewer backups, people flooded out of their homes, and we wanted to know, is this happening everywhere?," said Dinah Pulver, one of the project's lead reporters. "How many people, how many places, are contending with this kind of rainfall?"

A man in a red SUV surrounded by other cars and trucks that are also stuck and stalled waits to get help on I-94 West near Trumbull and Rosa Parks in Detroit on June 26, 2021. Heavy rains in Metro Detroit caused massive flooding in homes, streets and freeways.

We found more than half of the nation's 344 climate divisions had their wettest periods on record since 2018. We calculated the same rolling averages for states.

"East of the Rockies, more rain is falling, and it's coming in more intense bursts," our report finds. "In the West, people are waiting longer to see any rain at all."

"Taken together, the reporting reveals a stunning shift in the way precipitation falls in America."

AVOID THE CLOGS

Don't let a stopped-up irrigation system put a damper on your crops.

By Chris Manning

When irrigation systems become clogged, it causes production issues and negatively impacts plant growth. The good news is that it's a manageable problem with viable solutions that growers can implement.

"We are all very aware of the importance of watering," says Rosa E. Raudales, an assistant professor of horticulture and a greenhouse extension specialist at the University of Connecticut. "We're also aware of the importance of not over-watering, but also [of] not stressing our plants. If you allow your system to clog, then you're losing control because you can't really estimate how much you're going to water."

THE THREE TYPES OF CLOGGING

According to Raudales, there are three kinds of clogging growers should be aware of: physical, biological and chemical. She says that each type has different causes and symptoms that when identified, allow growers to zero in on the problem afflicting their greenhouses.

For physical clogging, she says it involves a suspended solid backing up the system, thus preventing water from reaching the plants.

"Think about if you're recirculating water and if you're carrying any type of remaining debris that's coming back from the soil," she says. "You would expect a physical [object] that would plug your system. Mostly that would be a concern for growers who are recirculating water or maybe growers who are using pond water as their water source because it tends to be a little dirtier than other sources."

Biological clogging occurs when biofilm builds up in an irrigation system's pipes and slows or stops water flow, Raudales says. It is most often greenish-brown colored, giving growers a visual indicator that their pipes are clogged.

"[Biofilm] is mostly foreign debris caused by bacteria, but you can also think of it as a combination of bacteria and algae," Raudales says. She adds that biological clogging can be the hardest type of clogging because there isn't a comprehensive solution for it.

Be aware of chemical clogging. Raudales says that this can be caused by different materials building up in the system, most notably iron. This type of clogging is often caused when a water source such as a well is contaminated and introduces harmful materials into the system, she says. Calcium, manganese and other materials can also cause clogging.

DIFFERENT TREATMENTS FOR DIFFERENT TYPES OF CLOGS

Raudales says treating physical clogging is straightforward, making it the easiest type of clogging for growers to deal with. Often, the material clogging the pipe is something that can be blown out the front of the system. All a grower needs to solve this issue is pressure.

For biological clogging, Raudales says it can take a "big effort" to combat it properly. For instance, if a propagation house's emitters are clogged with biofilm, growers must choose between a few different treatment strategies. One is to take the emitters down, replace them with clean ones and wash the clogged ones. Chemical treatments are also an option, although bacteria can become resistant to them over time.

Iron precipitates on the inside surface of a 3-inch pipe.

As for chemical clogging, the process is like treating physical clogging. Raudales says that it requires using a large concentration of the chemical being used to clear out the pipe and the line being shut down. It also requires an empty greenhouse or production area to avoid damaging plants.

The one significant factor that Raudales says links the different treatment options together is that unclogging irrigation systems is a labor-intensive process, and not all growers can take workers off other tasks in the growing operation and assign them to the problem. Cleaning the system is a necessity, even if it's time consuming.

She suggests starting an ongoing, low-dose chemical treatment that can reduce buildup over time in the

SPECIFICALLY, OUR REPORTING FINDS:

- At some point over the past three years, 27 states – all east of the Rocky Mountains – hit their highest 30-year precipitation average since record keeping began in 1895.
- A dozen states, including Iowa, Ohio and Rhode Island, saw five of their 10 wettest years in history over the past two decades.
- Michigan saw six of its wettest 10 years on record over the past 13 years.
- In June, at least 136 daily rainfall records were set during storms across five states along the Mississippi River.
- At the opposite extreme, eight states – including five in the West – had at least three record-dry years in the same time period. That's double what would be expected based on historical patterns.

"People talk about the climate we're leaving for our kids or the climate of the future," Pulver said. "But the reality is climate change is here now and it's affecting most of us."

SO HOW DOES THE WARMING PLANET IMPACT RAINFALL?

Michael Mann, a climatologist at Penn State University, told our reporters the greenhouse effect is important to keep Earth from freezing, but excess heat greatly reduces the temperature difference between the warmer tropics and cooler polar regions in the summer.

Mann said that reduction in the temperature difference slows down the jet stream, which makes it weaker and wavier in the summer. That means weather systems moving across the country can slow or stall more often.

"The gentle rains for a number of days are kind of disappearing and are being replaced by downpours," said Chris Davis, USA TODAY's executive editor for investigations. "And that in and of itself has a lot ramifications, everything from flooding, to mudslides out west, to how much fertilizer gets picked up and carried into the Mississippi River and down into the Gulf of Mexico."

Dan Bond stands in a debris field on Nov. 3, 2021. The debris was left over from the Black Hollow post-fire debris flow near his Colorado home.

In the West, the high temperatures and lingering high pressure systems pull moisture from soil and plants. The increased heat and long periods between rains contribute to record wildfires.

"They're all interconnected to the impact that climate change is having on these persistent weather extremes," Mann said. "It's not a contradiction to have huge floods, unprecedented floods and unprecedented heat waves and droughts at the same time."

The downpours bring a deluge of problems. Stormwater, sewage and drinking water pipes are 50 to 100 years old and nearing the end of their life expectancy, said Christine Kirchoff, an associate professor in civil and environmental engineering at the University of Connecticut.

That leaves communities increasingly vulnerable to flooding. It also prompts massive releases of treated and untreated wastewater into waterways, which can cause or inflame gastrointestinal issues.

Downpours also push fertilizer from Midwestern fields into rivers, which ultimately slowly poison the Gulf of Mexico.

"But it's not just the Gulf of Mexico," reported Ignacio Calderon, with our partner the Midwest Center for Investigative Reporting. "Fertilizer runoff wreaks havoc on rivers and lakes across the country. It contaminates drinking water, harms aquatic life and sickens both people and pets."

It took our reporters months to collect, organize, analyze and publish this information. Now, you can see how rainfall has changed in your community in just seconds.

Here, you can enter your address or ZIP code to see how rainfall has changed dating back to 1895.

Data reporter Kevin Crowe led our data analysis efforts, a huge undertaking given the number of climate divisions and years of data. Crowe ran our methodology by several scientists to make sure our findings were spot on. We also drew on the data and expertise of climatologist Brian Brettschneider.

WHAT STOOD OUT?

"Looking at states in the Midwest and in the Northeast and just how much more rain places like Michigan,

Indiana or Ohio or Pennsylvania are getting, that kind of boggled my mind," Crowe said. "I mean the Great Lakes are higher, all sorts of things kind of indicate that there's more water falling, but just seeing the overall trend lines was still pretty surprising."

Our team also dreamed up creative ways to help our readers understand the changing rainfall. Developer Chris Amico wondered if we could create a sonification of the hundred-plus years of rainfall data.

Pulver took that challenge to Florida's Full Sail University, where musicians composed songs based on changing precipitation patterns in several states.

Timothy Stulman, a composer and department chair of music composition, took on Pennsylvania. He gathered sounds of wind, thunder and rain, then combined those with flute and cello melodies. The density and volume directly correlate to the data.

"If there was a really high rainfall year, I would choose recordings of intense rainfall, strong winds, and mix them with loud thunderclaps," he told us. "So it's not a single recording of a storm, but rather various storm elements blended together based on the rainfall data."

The point of all of this work is to help people understand the impact of climate change, right now, in their specific communities.

"These extreme events are not coincidence. They're really all part of the same pattern," said investigative editor Emily Le Coz.

"You still hear terms like '100-year rainfall event' or this is a '50-year flood.' Those terms are sort of meaningless now. What's the point of calling it a 100-year event if it's happened five times in the last decade?"

"There's a lot that we need to do to wrap our brains around the new reality that we're living in." ●

College of Liberal Arts and Sciences

WHAT IS A MARGIN OF ERROR? THIS STATISTICAL TOOL CAN HELP YOU UNDERSTAND VACCINE TRIALS AND POLITICAL POLLING

By Ofer Harel

In the last year, statistics have been unusually important in the news. How accurate is the COVID-19 test you or others are using? How do researchers know the effectiveness of new therapeutics for COVID-19 patients? How can television networks predict the election results long before all the ballots have been counted?

Each of these questions involves some uncertainty, but it is still possible to make accurate predictions as long as that uncertainty is understood. One tool statisticians use to quantify uncertainty is called the margin of error.

LIMITED DATA

I am a statistician, and part of my job is to make inferences and predictions. With unlimited time and money, I could simply test or survey the entire group of people I am interested in to evaluate the question in mind and find the exact answer. For example, to find out the COVID-19 infection rate in the U.S., I could simply test the entire U.S. population. However, in the real world, you can never access 100% of a population.

Instead, statisticians sample a small portion of the population and build a model to make a prediction. Using statistical theory, that result from the sample is extrapolated to represent the whole population.

Ideally, a good sample should be representative of the total population, including gender, racial diversity, socioeconomic diversity, lifestyle patterns and other demographic measures. The larger the sample, the more similar it would be to the true population, and with a larger sample, the more confident statisticians

become in their predictions. But there will always be some uncertainty.

The larger the sample size, the more accurate the prediction and the smaller the margin of error.

Fadethree via Wikimedia Commons

QUANTIFYING UNCERTAINTY

Take drug development, for example. It is always true to predict that a new medication will be somewhere between 0% and 100% effective for everyone on Earth. But that isn't a very useful prediction. It is a statistician's job to narrow that range to something more useful. Statisticians usually call this range a confidence interval, and it is the range of predictions within which statisticians are very confident the true number will be found.

If a medication was tested on 10 individuals and seven of them found it effective, the estimated drug efficacy is 70%. But since the goal is to predict the efficacy in the whole population, statisticians need to account for the uncertainty of testing only 10 people.

Confidence intervals are calculated using a mathematical formula that encompasses the sample size, the range of responses and the laws of probability. In this example, the confidence interval would be between 42% and 98% – a range of 56 percentage points. After testing only 10 people, you could say with high confidence that the drug is effective for between 42% and 98% of people in the whole population.

If you divide the confidence interval in half, you get the margin of error – in this case, 28%. The larger the margin of error, the less accurate the prediction. The smaller the margin of error, the more accurate the prediction. A margin of error that is almost 30% is still quite a wide range.

However, imagine that the researchers tested this new drug on 1,000 people instead of 10 and it was effective in 700 of them. The estimated drug efficacy is still going to be around 70%, yet this prediction is much more accurate. The confidence interval for the larger sample will be between 67% and 73% with a margin of error of 3%. You could say this drug is expected to be 70% effective, plus or minus 3%, for the entire population.

Statisticians would love to be able to predict with 100% accuracy the success or failure of a new medication or

the exact outcomes of an election. However, this is not possible. There is always some uncertainty, and the margin of error is what quantifies that uncertainty; it must be considered when looking at results. In particular, the margin of error defines the range of predictions within which statisticians are very confident the true number will be found. An acceptable margin of error is a matter of judgment based on the degree of accuracy required in the conclusions to be drawn. As the shock of watching swarms of terrorists ransack the nation's Capital began." ●

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THE HOLOCAUST, HISTORY AND TODAY'S POLITICS

Teaching the Holocaust, alone, is not the solution to confronting antisemitism, racism, bigotry, and hatred

By Avinoam Patt and Aura Hilton

On January 6 the world watched as domestic terrorists stormed the U.S. Capitol building in Washington, DC. The pictures seared into our memories of this day are replete with symbols of hatred, racism, and extremism: The Confederate battle flag, the white power hand gesture, and the gallows erected near the Capitol reflecting pool.

What many may not have noticed within this sea of white supremacy was the prominence of anti-Semitic images: the black sweatshirt reading "Camp Auschwitz, Work Brings Freedom," and T-shirts emblazoned with the slogan: 6MWE = "6 million wasn't enough" above Italian fascist symbols. Those who wore these shirts invoked the Holocaust, not to deny it, but to promote the continuation of its aims and ideology.

Sixteen years ago, the UN officially declared January 27 an annual International Day of Commemoration in memory of victims of the Holocaust. By the time Soviet troops arrived at Auschwitz on January 27, 1945, the SS

forcibly had marched almost 60,000 starved and exhausted prisoners from the Auschwitz camp system westward into Germany; more than 15,000 would die on such death marches. At this camp, the Nazis exterminated 1.1 million people, 90% of whom were Jewish.

Among those Jewish prisoners liberated at Auschwitz, however, was a 25-year-old Italian chemist by the name of Primo Levi. Two years later, Levi would publish his account of his 11 months at Auschwitz under the title *If This is a Man* (later translated into English as *Survival in Auschwitz*). Levi's account of Auschwitz focused not only on the day-to-day existence of the camp and the interactions amongst the prisoners he encountered there, but also dissected, in clinical and dispassionate fashion, what Levi termed "the demolition of man," the process whereby the inmates at Auschwitz were completely dehumanized.

The existence of Auschwitz serves as a reminder of just what humans are capable of. When we teach about Auschwitz, we must remember that the camp stands as a symbol of the failure of humanity to stand up to unchecked hatred, bigotry, and tyranny, as a symbol of the challenge that confronts good people when faced with the absolute worst of human behavior. As the United States Holocaust Memorial Museum reminds us: "The Holocaust did not begin with killing; it began with words."

In recent years, this noticeable rise in hate speech, antisemitism, racism, and xenophobia has provided renewed momentum to legislative efforts to "fix" the problem, and by the end of last year, 16 states mandated some form of Holocaust and genocide education. Even so, state boards of education rarely provide the additional resources necessary to gain specialized training on the topic. Thus, the memory of the Holocaust is actually subverted and trivialized, used by politicians to avoid doing the hard work of fixing a broken educational system. Indeed, as Alvin Rosenfeld argued in "The End of the Holocaust:" "the very success of the Holocaust's wide dissemination in the public sphere can work to undermine its gravity and render it a more familiar thing. . . . Made increasingly familiar through repetition, it becomes normalized."

As educators, we know that the fix to rampant and willful ignorance, baseless hatred, and vile behavior is not so simple. We need a massive investment in basic

internet and information literacy to save our democracy. Our belief in democracy rests on humans' ability to reason, to separate fact from fiction, myth, and conspiracy theories. Equipping people with these basic tools is a starting point. We absolutely need to teach our students about Auschwitz and about gas chambers, but we also must teach them to distinguish between historical facts and the twisted lies of conspiratorial fiction and propaganda.

Teaching the Holocaust, alone, is not the solution to confronting antisemitism, racism, bigotry, and hatred. Teaching the Holocaust, alone, out of context, will not save our democracy. We need a systematic framework that teaches students the responsibilities of citizenship, the basics of human rights, and addresses massive income disparities and wealth gaps that plague public education in this country.

Teachers need to be trained how to teach difficult topics, how to engage in difficult conversations, and not to avoid what feels uncomfortable. If teachers teach the Holocaust, they need to be able to explain how easily a democracy can be subverted, how easy it is for ordinary people to turn their heads and look away, and how a system of discrimination can evolve into a policy of extermination.

The pervasiveness of the symbols of the Holocaust – swastikas, facile comparisons to concentration camps and Nazism across the political spectrum – indicate that the lessons of the Holocaust have not been learned. Indeed, they have become completely trivialized. This at a time when Nazis are literally marching in torch-light parades, carrying out pogroms in synagogues, and attempting to take over Congress.

Holocaust denial and distortion is not new, but for a long time it was fostered by a relatively small number of lunatic conspiracy theorists. The growth of the right-wing internet and social media means that a prominent space now exists, purposefully built and shared, where antisemitism, racism, and white supremacy can feed off one another.

The crowd that attacked the Capitol on 6 January not only proudly demonstrated their white supremacist beliefs but also indicated their readiness to put beliefs into action. They seek to use violence and hatred to create a world that matches their goal: destruction of those who believe in the equality of humans.

Holocaust education, by itself, will not be enough. Let us resolve to teach our young people how to determine the difference between historical fact and fiction. Let us equip our students with the tools to recognize hate speech, conspiracy theories, and dubious web resources. Let us hold big tech companies accountable for profiting off organized hate and discrimination, while hiding behind claims to “free speech” only when it is convenient. Let us hold them responsible for funding basic internet and information literacy. Maybe then we can help people understand why taking over Congress in an Auschwitz shirt is indicative of deep and real threats to our democracy. ●

THIS ARTICLE WAS FIRST PUBLISHED IN THE HARTFORD
COURANT ON JANUARY 10, 2021

THE ORIGIN OF THE VIOLENT ATTACK ON THE U.S. CAPITOL EXTENDS BACK DECADES

By Michael Hamad

As the shock of watching swarms of terrorists ransack the nation's Capital began to wear off, the questions started coming: Why weren't there enough police on duty? What was Donald Trump's role in inciting the violence? What immediate steps are needed to safeguard the Republic?

Less apparent, perhaps, but no less significant was a deeper question: How did we arrive at a moment where thousands of Americans felt justified in attacking the temple of American democracy?

To fully answer that question, experts say it's necessary to look further back than the false post-election rhetoric of the last few weeks, further back than the anger and hostility Trump has sown over the last four years and further back even than the landmark election of 2016 that brought Trump to power.

They point to Wednesday's events as part of a deep, longstanding distrust of our political system, inflamed and encouraged by Republican politicians who

normalized President Trump's erratic behavior and seditious rhetoric. That toxic combination culminated in the attempted coup at the U.S. Capitol building on Wednesday by armed extremists, many of whom were still seething over election results they felt were unfair.

"In many ways it's the manifestation of a lack and loss of confidence in our political system that has been developing for some time now, not just under the Trump era," said Sacred Heart University professor Gary Rose. "So many people today for various reasons — far right and far left — are simply losing confidence in the way we govern ourselves."

The 2020 presidential election was in some ways the exposed tip of an iceberg, towering over a mostly hidden mass of political and social polarization, animosity toward our fellow citizens and a broad suspicion of government institutions — all symptoms of a distressed nation and a democracy that's rapidly drifting away.

For many Americans already angry over salary compression and their inability to get ahead, the lockdown due to the coronavirus pandemic is a waking nightmare. Much of the anger is race-based; some feel their privileged positions are being threatened by immigrants or citizens of color.

But the root causes go back decades and even centuries, stretching from slavery to birtherism, from historical social divisions based on race and class to the extreme income inequality and partisanship of the Trump era.

"We're a fairly violent country when you look across the world and try to compare statistics," said Susan Herbst, professor of political science and president emeritus at UConn and the author of "Rude Democracy: Civility and Incivility in American Politics."

"There's no question this is kind of a unique violence of 2020, but it's been building over the past few decades, not just the last four or five years," she said.

HISTORICAL PRECEDENCE, ALTERNATIVE FACTS

The Courant spoke to a group of Connecticut lawmakers, scholars, clergy members and community leaders who tried to make sense of how America

arrived at a singular moment in its history — an armed insurrection on the grounds of the U.S. Capitol.

Herbst said that while President Trump's comments undoubtedly incited the violence at the Capitol, the insurrection wasn't necessarily rooted in public policy or ideological debate. "There's very few people who get involved at this level of protest who are interested in public policy," she said.

Rather, the deeper threats of immigration, globalism and the perception of coastal elites pulling the levers — all of which bubbled to the surface long before the Trump era — exploded after the presidential election and onto the grounds of the Capitol.

UConn Professor Susan Herbst said the violence of last week has been building for decades.

Herbst compared the current moment to the 1930s, when President Franklin Delano Roosevelt steered the nation through the Great Depression amid widespread criticism by populists like Louisiana Governor Huey Long and antisemitic activist Father Charles Coughlin and alongside the looming threat of fascism, which was already taking over Europe and had won over thousands of sympathizers in the United States.

"People were scared to death that they wouldn't be able to feed their families and looking for solutions everywhere, and FDR chose the path of unification," Herbst said. "Our economic situation is not close to that despite the pandemic, but that's our best place to look besides those years before the Civil War, which are a different kind of context."

Officials have identified leaders of the Proud Boys and other extremist right-wing groups among the insurrectionists, many of whom were photographed holding Confederate flags and wearing clothing displaying anti-Semitic slogans.

Jeffrey Alexander, a cultural sociologist at Yale, said the incident at the Capitol — and the encouragement of Trump, who is still perceived by many to be a successful businessman and political outsider — allowed participants from working-class and military backgrounds to live out a fantasy of toppling the Washington, D.C. elites.

"It gave them a feeling of self-importance, and that they were accomplishing something of historic importance," Alexander said, "which is, of course, how the Nazis felt,

at least the early Nazis. ... All societies are driven by extreme strains and stresses, and there's a lot of people who are left out at any given time on the left and on the right."

Still, Trump's in-person speech Wednesday was the match that lit the powder keg, Alexander said, leading far-right extremists and alienated citizens up the steps of the Capitol.

"Trump likes to punish people, and that's how it is in business," Alexander said. "I look at him as a certain kind of real estate mogul. This is a world of sharks, and he brought that mentality, plus a lot of personality disorders, narcissism, arrogance and wealth, into an office where I don't think it's ever been occupied by somebody like that."

Others said the attempted coup has roots in the degradation of truth and the spread of "alternative facts," which Facebook and other social media outlets have exacerbated in recent years.

"We actually have raised a generation to question: do you think that's right? Should it be interpreted a different way?" said Joanne Berger-Sweeney, president and professor of neuroscience at Trinity College in Hartford. "And to some degree, I think we have kind of taken it a bit to the extreme, where people are questioning whether they're common truths and sets of facts."

What led to the insurrection, Berger-Sweeney said, is everyday citizens getting their news channeled directly to them rather than reading a variety of news outlets.

"We're losing a bit the concept of what a fact is and what truth is in some situations," she said, "such that one group of people believes one set of things and another group of people believes another set of things, and there's not much overlap in that Venn diagram in the society that we have built and particularly perpetuated in the last half decade."

A DOUBLE STANDARD

Bishop John L. Selders Jr., organizing pastor of Amistad United Church of Christ in Hartford, assistant dean of students at Trinity College and co-founder of Moral Monday CT, recalled being arrested inside the U.S. Capitol in 2018 as he prayed and sang in front of then-Sen. Orrin Hatch's office.

"I was cuffed, escorted out of the building and taken to a holding facility where I was given my arrest papers," Selders said. "It took quite a bit for us to get in the building in the first place. How did these people get in and occupy the building and there wasn't a prepared response?"

After watching a horde of mostly white Trump supporters storm past Capitol police with little resistance, community leaders pointed to the harsh treatment of racial justice protesters, stretching back to the events in Ferguson, Mo., several years ago and culminating with Black Lives Matter protests across the country this summer.

Jay Williams, president of the Hartford Foundation for Public Giving, said the insurrection was partly the result of racial tensions stretching back to slavery that have never been fully reconciled.

"There's still a double standard in this country," Williams said. "No, we don't have Jim Crow laws on the books and we don't have separate water fountains and separate entrances, but the lingering effects of that structural racism and inequity have only been exacerbated over generations. The wealth that was robbed from communities of color decades ago, generations ago, has only gotten worse."

Trump, Williams said, would have immediately invoked the Sedition Act of 1798 if the insurrection was led by Black Lives Matter protesters — and he would be justified in doing so.

"It would have happened in a heartbeat," he said. "There were dozens of arrests, but there would have been *hundreds* of arrests. The bloodshed, as tragic as it was, would have been orders of magnitude greater."

'POLITICIANS WHO SHOULD HAVE KNOWN BETTER'

Along with instigators on the ground, Democratic lawmakers in Connecticut blamed Trump, Sen. Ted Cruz, Sen. Josh Hawley and other Republican legislators for enabling the attack.

"I lived through yesterday but I almost worry more about my Republican colleagues who, even after their lives were put in danger by President Trump, got right back to business supporting President Trump's lies and

conspiracies,” said U.S. Rep. Jim Himes, a Democrat who represents Connecticut’s 4th District.

On Thursday, Himes called Cruz and Hawley “powerful politicians who should have known better” and said he hopes the inauguration of President-elect Joe Biden will usher in a more stable era in American politics, even as the country reckons with the wreckage of the last four years.

“Our founding fathers built a system that was designed to contain demagogues like Donald Trump,” Himes said. “Yesterday, it survived, but people like me have to do a lot of thinking about how to create a more welcoming, open civic space.”

Sen. Richard Blumenthal placed the blame for the insurrection squarely on Trump’s shoulders, calling it “disgusting and despicable” and characterizing it as the logical conclusion of Trump’s contempt for the rule of law and his incitement of violence.

“Donald Trump is clearly an inept and incompetent wannabe dictator, and he is opening a path to more competent and effective would-be tyrants in the future,” Blumenthal said. “He is normalizing that misconduct that has been enabled over the past four years and which should have been stopped with the impeachment of the president a year ago.”

Rob Simmons, a former Republican Congressman in the 2nd District who spent 13 years working in the Capitol (seven as a Senate staffer for John Chafee and Barry Goldwater and another six as a member of the U.S. House), said ill feelings harbored after the Mueller Investigation and other attacks on Trump since 2016 led to this insurrection.

“This presidency has been subject to unprecedented false allegations and attacks for four years,” he said. “You think the supporters of just over 70 million Americans aren’t upset at that behavior? I’ve been around for a long time. ... I have never seen a sitting president treated in this fashion. Never. And that plays out to his supporters, like it or not.”

Simmons also said he believes the pro-Trump rally was infiltrated by Antifa activists. To date, there has been no official confirmation of Antifa or similar activist groups participating in the events at the Capitol.

“These things don’t happen by accident,” he said. “I spent 10 years in the CIA. I think I know a little bit about

how to foment insurrection. You can point to the president and he certainly has to accept a certain amount of blame, but it’s not all about him. That’s probably something the Courant won’t publish, but that’s OK. That’s what I believe.” ●

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SCIENTISTS DECRY DEATH BY 1,000 CUTS FOR WORLD’S INSECTS

By Seth Borenstein

The world’s vital insect kingdom is undergoing “death by a thousand cuts,” the world’s top bug experts said.

Climate change, insecticides, herbicides, light pollution, invasive species and changes in agriculture and land use are causing Earth to lose probably 1% to 2% of its insects each year, said University of Connecticut entomologist David Wagner, lead author in the special package of 12 studies in Monday’s Proceedings of the National Academies of Sciences written by 56 scientists from around the globe.

The problem, sometimes called the insect apocalypse, is like a jigsaw puzzle. And scientists say they still don’t have all the pieces, so they have trouble grasping its enormity and complexity and getting the world to notice and do something.

Wagner said scientists need to figure out if the rate of the insect loss is bigger than with other species. “There is some reason to worry more,” he added, “because they are the target of attack” with insecticides, herbicides and light pollution.

Co-author and University of Illinois entomologist May Berenbaum, a National Medal of Science winner, said, “Insect decline is kind of comparable to climate change 30 years ago because the methods to assess the extent, the rate (of loss) were difficult.”

Making matters worse is that in many cases, people hate bugs, even though they pollinate the world’s foods, are crucial to the food chain and get rid of waste,

she said. Insects “are absolutely the fabric by which Mother Nature and the tree of life are built,” Wagner said. Two well known ones — honeybees and Monarch butterflies — best illustrate insect problems and declines, he said. Honeybees have been in dramatic decline because of disease, parasites, insecticides, herbicides and lack of food.

Climate change-driven drier weather in the U.S. West means less milkweed for butterflies to eat, Wagner said. And changes in American agriculture remove weeds and flowers they need for nectar.

“We’re creating a giant biological desert except for soybeans and corn in a giant area of the Midwest,” he said. Monday’s scientific papers don’t provide new data, yet show a big but incomplete picture of a problem starting to get attention. Scientists have identified 1 million insect species, while probably 4 million more are still to be discovered, Berenbaum said.

University of Delaware entomologist Doug Tallamy, who wasn’t part of the studies, said they highlight how the world has “spent the last 30 years spending billions of dollars finding new ways to kill insects and mere pennies working to preserve them.”

“The good news is, with the exception of climate change, individuals can do much to reverse insect declines,” Tallamy said in an email. “This is a global problem with a grassroots solution.” ●

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BEETLE KEEPS RIVALS OFF SCENT OF FOOD BURIED FOR OFFSPRING

By Marion Renault

Some beetles go to great — and disgusting — lengths for their children.

They scout for a dead mouse or bird, dig a hole and bury it, pluck its fur or feathers, roll its flesh into a ball and cover it in goop — all to feed their future offspring.

Now scientists think that goo might do more than just slow decay. It also appears to hide the scent of the decomposing bounty and boosts another odor that repels competitors.

“It helps them to hide their resource from others,” said Stephen Trumbo, who studies animal behavior at the University of Connecticut and led the new research, published Thursday in *The American Naturalist*. “They try to keep everyone away.”

The beetles — called burying beetles — aren’t the only creatures who try to deceive their competitors or prey with subtle, sneaky tactics. Large blue butterflies, for example, will imitate certain sounds to manipulate ants. Corpse flowers produce rotting odors to attract insect pollinators that feed on decomposing matter.

The importance of these interactions are being recognized more and more, said Alexandre Figueiredo, a biologist at University of Zurich, who was not involved in the new study.

Burying beetles and other things that feed on dead animals — including vultures, opossums and maggots — race each other to track down carcasses. Competition is stiff even among burying beetles, which use special antennae to detect the remains from afar.

Burying beetles are relatively large, about an inch long, and black with orange markings. The gut secretions they spread on a carcass are antibacterial, and slow down decomposition. Trumbo and his colleagues wondered whether they also prevented rivals from picking up the scent.

To find out, they collected the gases wafting off dead hairless mice preserved by a kind of burying beetle that is found in forests across North America. The researchers then compared the gases to those from untouched carcasses.

The beetle-prepped ones gave off much less of an onion-smelling compound that usually attracts burying beetles to fresh remains. They also discovered an increase in another gas from decay that’s known to deter other insects that feed on dead animals.

Next, they dropped off the dead mice in a Connecticut forest. They found the beetle’s rivals were less likely to discover the ones covered in goop.

“If you can deter other scavengers, even for a little bit of time, it can buy you a lot,” said Daniel Rozen, a biologist at Leiden University in the Netherlands who was not involved in the new study. ●

THIS ARTICLE WAS FIRST PUBLISHED IN THE CONVERSATION
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WHY DO PRESIDENTIAL INAUGURATIONS MATTER?

By: Dimitris Xygalatas

As one president’s term ends and another begins, there is a ceremony. Its importance is one of symbolism rather than substance. The Constitution is clear: On Jan. 20, there will be a transfer of power. There is no mention of an inauguration.

By definition, ritual acts have no direct effect on the world. A ceremonial event is one that symbolically affirms something that happens by other, more direct means. In this case, the election – not the inauguration – makes the president, although an oath is required before exercising his power.

Nonetheless, ceremonies matter. Having spent two decades studying ritual, I can attest to that. So can the recent history of inaugurations: In 2009, Barack Obama misplaced one word when reciting the presidential oath of office. As a result, he decided to retake the oath the next day. And in 2017, Donald Trump insisted that his inauguration was attended by a record-setting crowd, even as everyone’s eyes saw otherwise. He saw the size of the attendance as a measure of his legitimacy.

The first inauguration of a president of the United States, George Washington, happened in New York City on April 30, 1789. Ramon de Elorriaga, via Wikimedia Commons

RITUAL EFFICACY

Throughout history, all human societies have used rituals to mark major events and transitions: personal landmarks like birthdays and weddings, group

accomplishments such as graduations, and government transitions of power. Those ceremonies send signals that command our attention and strengthen the perceived importance of those moments.

Don’t let yourself be misled. Understand issues with help from experts

Ritual actions involve formality, precision and repetition. A priest must wear a special garment; a prayer must be uttered word for word; and a mantra might be recited 108 times. These features make rituals appear similar to more goal-directed actions: A judge banging a gavel resembles a carpenter hammering a nail. Due to these similarities, our brains assign those acts actual power.

This is what my collaborators and I found in a soon-to-be-published study. We showed people videos of basketball players shooting free throws and asked them to predict the outcome of each shot. Half of those videos showed the players performing a brief ritual, such as kissing the ball or touching their shoes before shooting. The other half did not include any ritual.

Participants predicted that the ritualized shots would be more successful. They were not. But their minds unconsciously tied the arbitrary actions preceding those shots with their expectations for the outcome.

President Ronald Reagan is sworn in, Jan. 20, 1981. U.S. National Archives

SPECIAL MOMENTS

Collective rituals carry the weight of tradition, which gives them an aura of historical continuity and legitimacy. Even though they do change from time to time, they are often perceived as unchanged and unchangeable.

For instance, Thanksgiving celebrations have been modified several times, often by presidential decree. Yet, a recent study reported that people found the mere suggestion of altering holiday traditions morally offensive. Rituals “represent group values and hence seem sacred.”

Public ceremonies like inaugurations are wrapped in pageantry. They involve music, banners, speeches and more – the more important the moment, the more extravagant the ceremony. When we attend a ritual loaded with splendor, it is as if a little voice inside our

brain is telling us: “Pay attention, because something important and meaningful is happening.”

The only provision in the Constitution is that the new president must be sworn in. Thirty-five words is all that is required: “I do solemnly swear (or affirm) that I will faithfully execute the Office of President of the United States, and will to the best of my ability, preserve, protect and defend the Constitution of the United States.”

When Jan. 20 falls on a Sunday, the inauguration is held on the following day. In that case, the oath is administered twice: privately on the Sunday, when the actual transfer of power takes place, and publicly again on Monday, for ceremonial reasons.

The exuberance and theatricality transforms what could be a mundane, ordinary moment into something memorable and noteworthy.

Banners and flags adorn the U.S. Capitol during Bill Clinton’s first inauguration in 1993. U.S. National Archives

INTUITIVE APPEAL

Ceremonies speak directly to some of our basic instincts, triggering intuitions about their efficacy, symbolism and importance. Human institutions have adapted to reflect – and harness – those instincts to strengthen the perceived importance of our social institutions and the unity of civil society.

This is, in fact, why heads of state who are not popularly elected tend to hold more flamboyant public ceremonies than their democratically chosen counterparts. Even in countries where kings and queens are powerless, their enthronements are celebrated with far more splendor than the inaugurations of elected leaders.

But there is a flip side to this. Populist leaders, who are successful thanks to their ability to capitalize on people’s instincts, are almost always fond of ritual exuberance. For his inauguration, Donald Trump reportedly requested a military march, complete with tanks, missile launchers and jet fighters.

The Department of Defense apparently declined most of these requests, out of worry that the inauguration would look like a totalitarian power display. But many

of Trump’s supporters liked the idea precisely for that reason.

When Trump finally managed to get tanks in the streets for a July Fourth parade in 2019, one of his fans wondered: “If Korea can have a military parade, why can’t we?”

Due to the COVID-19 pandemic, Joe Biden’s inauguration will be scaled down and mostly virtual. Donald Trump is not planning to attend, thereby missing the opportunity to see a smaller inauguration crowd than his own. ●

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BEETLE PARENTS MANIPULATE INFORMATION BROADCAST FROM BACTERIA IN A ROTTING CORPSE

By: Stephen Trumbo

Biologists are accustomed to hearing stories of microbes manipulating their host – a fungus that turns ants into suicidal zombies, a protozoan that makes rats seek out cat urine – but there are few examples of hosts turning the tables on their microbes.

My colleagues and I just published a paper that demonstrated that the burying beetle, *Nicrophorus orbicollis*, found in eastern North America, alters the odors produced by microbes from their subterranean nest to thwart competitors that would steal the beetles’ cache.

A SERIES OF UNPLEASANT ODORS

I have studied burying beetles for over 30 years, at first to understand their parental behavior and physiology, but more recently their role in the community of carrion insects that recycle vital nutrients into the soil. The olfactory environment of burying beetles is one that

disgusts many humans but has fascinated me because it is the context in which beetles find their food, advertise for a mate and compete with rivals.

The volatile chemicals that microbes produce as they flourish on a corpse change as the animal decomposes. This changing bouquet of molecules attracts a succession of different insect species. The different mixes of odors represent specific stages of decay that will cue insects that specialize on a fresh corpse or the remains at the end of decomposition, or something in between. Such information may be useful in criminal cases to determine the post-mortem interval.

The focus of a burying beetle nest is a small dead animal that a male-female pair moves underground to prepare as food for its young. Microbes living on a fresh mouse carcass begin to metabolize proteins, emitting sulfurous byproducts that waft in the breeze. These odors attract a flying burying beetle searching for a breeding opportunity.

Working with Paula Philbrick, a microbiologist, I began with field trials to identify the chemicals that burying beetles respond to, so we could discover which ones they might want to manipulate. We tested two chemicals – dimethyl disulfide and dimethyl trisulfide – known to attract carrion insects. These chemicals are used by corpse-mimicking plants in their own manipulation – fooling carrion-seeking flies and beetles into pollinating their putrid flowers

When we tried these compounds as supplements next to a fresh mouse carcass, however, free-flying burying beetles showed little interest. With our best guess off the mark, we were overwhelmed at the thought of randomly testing each of the more than 500 chemicals associated with a rotting carcass.

TELL US WHAT YOU KNOW

Rather than playing a chemical guessing game, we decided to take another approach, to see whether the beetles could show us what was important to them.

Our colleagues Sandra Steiger and Johannes Stökl at the University of Bayreuth used a technique called gas chromatography-mass spectroscopy to compare the volatile molecules emitted from carcasses prepared by a pair of *N. orbicollis* with those emitted from carcasses that had not been touched by beetles.

Surprisingly, two sulfur compounds that were not known to be an important cue for for any insect – methyl thiocyanate and methyl thiolacetate – were both reduced more than twentyfold by the beetles' labor on the carcass. Why would they do this, and how?

Methyl thiocyanate turns out to be a great cue for burying beetles searching for a carcass. When we went back to the field and placed methyl thiocyanate next to carcasses, over 90% were discovered by burying beetles the first night, compared with a discovery rate of 0% to 20% for fresh carcasses without the chemical supplement.

Methyl thiocyanate appears to be heaven-scent for a beetle searching for that rare, newly deceased mouse or bird somewhere in the forest that is unclaimed by a vertebrate predator or scavenger. Once a carcass is discovered, however, the resident beetles face a problem. The same odors that alerted them could also reveal their carrion prize to competitors. Burying beetles are excellent at detecting and responding to information, but do they control this information as well?

A DISINFORMATION CAMPAIGN

The transformation of a mouse carcass into beetle food is astonishing. After burying the carcass, the pair works day and night to remove the hair, round the carcass into a ball, and apply anal secretions to the exposed skin, dragging their abdomens in a zigzag pattern while circling the carcass.

Scientists used to believe that the resident pair of burying beetles might be sterilizing the carcass, eliminating the microbes that release the telltale odors from the carcass hidden beneath the forest floor. While the secretions do contain antimicrobials, they also contain microbes from the beetles' gut. The result is a microbial community where the microbes are just as numerous as on an unprepared carcass, but with fewer microbial species than in the normal mix.

This manipulated microbiota emits far less methyl thiocyanate, and surprisingly, much greater amounts of dimethyl trisulfide – the aforementioned compound that is associated with the middle stages of decomposition where competing blowfly larvae make the carcass worthless to a burying beetle.

When we placed dimethyl trisulfide next to a fresh mouse carcass, free-flying beetles were not likely to land, apparently deterred by an odor that indicates a carcass is too far decomposed for breeding burying beetles. A resident pair of beetles makes it difficult for beetle competitors to use odors to find their carcass in two ways: by decreasing chemical attractants and by disinforming rivals by increasing chemical deterrents.

When we took beetle-prepared carcasses from the lab and buried them in the field, they were much less likely to be discovered than similar-aged carcasses that had not been prepared by breeding beetles. Although resident burying beetles will fight to the death if an intruder shows up, the beetles prefer to avoid combat altogether.

Complex adaptations of animals with their microbiota are most often associated with gut microbes that aid host digestion, or cultured microbes that provide food. It makes sense, however, for resource specialists like burying beetles that consistently encounter an external microbiota to evolve similar levels of complexity.

Odors emitted by microbes are essential components of animal communication, social interactions, sexual selection, predator-prey interactions and plant-fungi symbioses. While the control of microbially derived odors by burying beetles might be one of the better examples, the ubiquity of microbes and their chemical products suggest that similar host manipulations will be common, even though humans have been oblivious to these adaptations and their importance. ●

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AMANDA GORMAN'S SUCCESS STIRRED A BLEAK UNDERCURRENT

By Manisha Sinha

Amid the phenomenal response to Amanda Gorman, who delivered a poem to wide acclaim at President Joe Biden's inauguration, lurked a bleaker current: responses that summoned for me the story of enslaved

early American poet Phillis Wheatley. In 1773, Wheatley became not just one of the first Black women but one of the first American women to be published when her book of poems, "Poems on Various Subjects, Religious and Moral," was printed in London. Wheatley traveled to England with her master's son when her book was published, and according to biographer Vincent Carretta, probably returned to America only on the condition she be granted her freedom.

As Carretta has put it, Wheatley was "the unofficial poet laureate of the new nation-in-the-making."

Wheatley was a genius by any standard. Brought to America from Africa in 1761, at 7 years old, she was educated by her enslavers who had lost a daughter her age. Wheatley learned English and Latin and wrote her first poem four years later. So remarkable was the story of the young slave poet that a bevy of Boston worthies, including John Hancock, examined her and testified to the authenticity of her poems to confirm what many surely doubted -- that a young enslaved Black girl could produce such polished work.

But along with praise came unabashed, racist criticism. The West Indian slaveholder Richard Nisbet dismissed her "silly poems." Thomas Jefferson, who speculated on black intellectual inferiority in "Notes on the State of Virginia" (1785) wrote, "Religion indeed has produced a Phyllis Whately [sic]; but it could not produce a poet. The compositions published under her name are below the dignity of criticism." Here Jefferson simultaneously acknowledged Wheatley's poetry while condescendingly dismissing them, much like Gorman's modern critics. Just in case, he also slyly questioned her authorship for all those who held up Wheatley's poetry as proof of Black equality. For a long time, American literary critics cast such judgment on Wheatley's poems.

Recently, a writer for the conservative British magazine, The Spectator, criticized Gorman in language that echoed these dismissals of Wheatley's talent. After condescendingly complimenting Gorman on her appearance and performance at the Inauguration (and before comparing her diction and delivery unfavorably to Dr. Martin Luther King Jr.'s), journalist Melanie McDonagh called the "The Hill We Climb" a "terrible poem." Line by line, as she questions the poem's grammar, syntax and style, she ironically punctuates her criticism with such verbal treasures as "Eh?" and "Dunno." Clearly conversant in the colonial Lord Alfred

Tennyson's school of poetry, McDonagh concludes, "The Hill We Climb turns out, I think, to be just a bit rubbish." I "dunno" but I think she missed an "of" before rubbish in that sentence.

African American women have long been at the receiving end of such half-baked and belittling put-downs. McDonagh's dismissal was staggeringly patronizing in its picking apart of Gorman's structure, grammar and use of poetic devices: "I got the sentiment, I got the stream of consciousness, the emotion, I got the sub-Martin Luther King flow. But trying to make the whole thing cohere, structurally and grammatically -- and in terms of sense -- was another matter." Another critic, Malcolm Salovaara of *The American Conservative*, went even further, calling Gorman's poem and performance propaganda and "nothing less than an embarrassment to our country."

Such criticisms are reminiscent of the kind Wheatley was subjected to and more recently, takedowns of other Black women poets blocked from the mainstream literary canon, too numerous to list. One recent criticism that stands out came from the *National Review*, when Tim Cavanaugh offered cold praise for the Inauguration Day poem of one Black woman, Maya Angelou (who had recently died) by saying he didn't really like her work, but that it was comparable to Samuel Taylor Coleridge's "Rime of the Ancient Mariner" (notably a classic by a White male Romantic poet) when put alongside the inaugural poems of Richard Blanco, a gay Latino man, and Elizabeth Alexander, a Black woman whose work he described as "a poem so boring economists now believe it reduced America's 2009 GDP by a quarter of a percentage point."

Neither McDonagh's or Salovaara's reactions, though, have been the rule. Far from it. Gorman's poem has been generally received with fulsome praise and accolades. Her book of poems sold out on Amazon, she will read a poem at the Super Bowl and she has received a modeling contract.

And yet even this praise, in some of its forms, feels like history repeating itself in racist terms. She has been touted by nearly all commentators as truly exceptional - yet treated by others with the kind of racial exoticism that is too often the subtext of people's reactions to Black excellence and talent. Some of us continue to fawn over successful African Americans, while

remaining blind to the plight of a majority of Black people, who face wealth inequity, health disparities and are at higher risk of experiencing police brutality.

Though separated by centuries, wildly disparate life experiences and so many other differences, this echo between Wheatley and Gorman serves as a reminder: Black women poets, from Wheatley to Gorman, seem to have an impossible task balancing their mastery of art with the authenticity of their experiences and history. Despite her classical style of poetry and deeply felt Christian universalism, Wheatley proudly asserted her African identity, signing her poems "Ethiop" and naming Terence, the African poet from antiquity, as her inspiration.

AMANDA GORMAN REMINDED AMERICA WHAT POETRY CAN DO

Like Gorman, she found herself internationally feted. The French philosopher Voltaire, British abolitionists Granville Sharp and Thomas Clarkson, and American revolutionaries such as Benjamin Franklin and Benjamin Rush praised her poems. An admiring John Paul Jones, the daring patriot naval commander, sent his verses to her. When Wheatley wrote to George Washington, enclosing a poem she had written in his honor, he replied with a desire to meet "one so favored by the Muses."

Despite naysayers, both Wheatley and Gorman elicited broad admiration, especially from women. In Massachusetts, Jane Dunlap cited "the young African damsel" as an inspiration for her own poetry, just as scores of poets across the world were moved by Gorman. And just as Wheatley's poetry has long outlived criticism, no amount of sour grapes can mar Gorman's glorious and enduring achievement. Or the moment when the first Black and Indian American woman became the Vice President of the United States, or when a pastor from the historic Black abolitionist denomination, the African Methodist Episcopal Church, delivered the inauguration's final benediction. Somewhere Wheatley's spirit surely approved of Gorman's poem and the proceedings.

For the millions of viewers who tuned in to watch the inauguration of President Biden and Vice President Kamala Harris, one of the most uplifting parts of the ceremony was without a doubt Gorman's ode to American democracy. In "The Hill We Climb," she

GALAXY-SIZE GRAVITATIONAL-WAVE DETECTOR HINTS AT EXOTIC PHYSICS

Recent results from a pulsar timing array, which uses dead stars to hunt for gravitational waves, has scientists speculating about cosmic strings and primordial black holes

By Adam Mann

The fabric of spacetime may be frothing with gigantic gravitational waves, and the possibility has sent physicists into a tizzy. A potential signal seen in the light from dead stellar cores known as pulsars has driven a flurry of theoretical papers speculating about exotic explanations.

The most mundane, yet still quite sensational, possibility is that researchers working with the North American Nanohertz Observatory for Gravitational Waves (NANOGrav), which uses the galaxy as a colossal gravitational-wave detector, have finally seen a long-sought background signature produced when supermassive black holes crash and merge throughout the universe. Another interpretation would have it originating from a vibrating network of high-energy cosmic strings that could provide scientists with extremely detailed information about the fundamental constituents of physical reality. A third possibility posits that the collaboration has spotted the creation of countless small black holes at the dawn of time, which could themselves account for the mysterious substance known as dark matter.

“People have been making predictions about cosmic strings and primordial black holes for years, and now, finally, we have a signal,” says Chiara Mingarelli, an astrophysicist at the University of Connecticut and a member of the NANOGrav team. “We’re not sure what is generating this signal, but a lot of people are really, really excited.”

beautifully captured the unending yet hopeful black struggle to realize its promise. Commentators compared her to famous African American women poets, who preceded Gorman on the Presidential Inauguration stage. The late Maya Angelou at President Bill Clinton's 1992 inauguration and Elizabeth Alexander at President Barack Obama's inauguration in 2008. But the real predecessor of the nation's first young poet laureate, is the foremother of American poetry, the enslaved teenaged girl from 18th century Massachusetts, Phillis Wheatley.

Gorman shares Wheatley's clear-eyed view of the trials that Black people faced in the slaveholding republic. Wheatley's poems do not shy away from the dark history of enslavement while committing to a vision of American democracy that may encompass all. Compare Wheatley's unpublished poem with Gorman's meditation on democracy. Wheatley wrote:

*But how, presumptuous shall we hope to find
Divine acceptance with th' Almighty mind---
While yet (O deed ungenerous!) they disgrace
And hold in bondage Afric's blameless race?*

Both young poets point to the acute danger racism poses to the American experiment in republican government. At a moment when an unregenerate racist minority would destroy that experiment rather than accept equal Black citizenship, their words remain a clarion call to recommit ourselves to preserve America's interracial democracy. ●

The physics community has learned a great deal about the universe from massive terrestrial gravitational wave experiments such as the Laser Interferometer Gravitational-Wave Observatory (LIGO) and its European counterpart Virgo. But just as electromagnetic waves come in a spectrum ranging from squashed gamma-rays to lengthy radio waves, gravitational waves run the gamut from the tiny vibrations in spacetime made when sun-size black holes merge to those with wavelengths measurable in light-years that can take decades to pass by our planet. The collective, overlapping cacophonies from those larger waves, thought to be produced when behemoth black holes lurking in the centers of galaxies collide, are what the NANOGrav collaboration has been working to capture.

It does so by focusing on objects known as millisecond pulsars, which arise when massive stars explode as supernovae and leave behind their rapidly spinning remnant hearts. A pulsar's strong magnetic field can create a beam of radiation that swings around, repeatedly sweeping past Earth with a regularity that rivals the accuracy of atomic clocks. Should a distortion in the fabric of spacetime come between our planet and a pulsar, it can cause this signal to arrive slightly earlier or later than expected. Were a telescope to see one such offset, it probably would not mean much. But NANOGrav has been monitoring the light from 45 pulsars scattered over thousands of light-years for more than 12.5 years, looking for correlations between their arrival times that could indicate the presence of gravitational waves.

Last September, the collaboration posted a paper on the preprint server arXiv.org, which hosts scientific articles that have yet to go through peer review, showing that its monitored pulsars all displayed similar blips. (The paper has since been peer-reviewed and published.) The chances of this happening are between 1,000 and 10,000 to one, say Mingarelli. As a group, NANOGrav is cautious and has refrained from claiming it has seen a gravitational-wave signal, which requires observing highly specific correlations among its pulsar signals' arrival times. That did not stop other scientists from jumping on the data.

Marek Lewicki, a theoretical physicist at the University of Warsaw in Poland, recalls that the NANOGrav study appeared early on a Friday morning and that, by 10 A.M., his collaborator John Ellis of King's College London

had spotted it. Though the usual explanation for such a signal is the supermassive black hole gravitational-wave background, Lewicki knew that another possible culprit was cosmic strings, and he began running models to see if this option could account for the data. "By Saturday, it was pretty clear it was a good fit," he says.

Researchers like cosmic strings because they directly connect cosmological events to high-energy particle physics. Shortly after the big bang, three of the four known forces—electromagnetism and the strong and weak nuclear forces—would have been smushed together into one superforce. When the strong nuclear force dissociated itself, the universe would have gone through what is known as a phase change, much like water freezing into ice. And just as a frozen lake often contains long cracks created when its bulk solidifies, the visible cosmos would become strewn with enormous nearly-one-dimensional tubes of energy crisscrossing its length. Such objects would be tense like piano strings and could vibrate out gravitational waves that would look like the signal NANOGrav had picked up.

Because these cosmic strings originated near the beginning of time, they would carry information about processes such as cosmic inflation, during which the universe is thought to have rapidly ballooned by mind-boggling factors, as well as the creation of different particles at different extreme temperatures, says Kai Schmitz, a theoretical physicist at CERN near Geneva. Information from such conditions, which would be impossible to create in particle accelerators such as the Large Hadron Collider, could help researchers produce a grand unified theory connecting most known particles and forces that would supersede the current Standard Model. Along with two collaborators, Schmitz published a paper in Physical Review Letters (PRL) outlining how cosmic strings could account for the NANOGrav data on January 28, the same day a similar article by Lewicki and Ellis appeared.

"If we detected cosmic strings, it would be the detection of my lifetime," says Eugene Lim, a cosmologist also at King's College London. "It would be more important than the Higgs boson, probably more than gravitational waves themselves."

For this reason, Lim, who was not a co-author on either paper, stresses that such concepts need to be considered with an abundance of restraint. The NANOGrav collaboration still needs to confirm that it is

in fact seeing gravitational waves. And the shape of those gravitational waves' spectrum has yet to be traced out and found to conform to the cosmic string interpretation, each of which is likely to take years, he adds.

Meanwhile, another contingent of the physics community has suggested that the signal could originate from entities known as primordial black holes. Unlike regular black holes, which are born when gigantic stars die, these would form in the early universe, when matter and energy were nonuniformly scattered through the cosmos as a consequence of processes that occurred at the end of inflation. Certain overdense areas could collapse under their own weight, generating black holes in a variety of sizes. Observations from LIGO and Virgo that could indicate mergers between primordial black holes have already planted the idea in many researchers' minds that these strange objects are more than speculative fictions. Certain theorists like them because, as entities that give off no light, they could account for some or even all of the dark matter in the universe.

"This is an economical explanation," says Antonio Riotto, an astroparticle cosmologist at the University of Geneva, because they do not require theorizing about exotic undetected particles such as WIMPs or axions, which have thus far dominated physicists' musings about dark matter.

Along with two co-authors, Riotto has written a third paper appearing in PRL showing how the NANOGrav signal could be accounted for by a multitude of black holes the size of asteroids being created shortly after the big bang, producing a gravitational wave relic that would travel to us in the modern day. According to the researchers' model, these miniature primordial black holes could comprise up to 100 percent of the dark matter in the universe.

Yet this possibility, too, needs to be approached carefully, says Juan García-Bellido, a theoretical physicist at the Autonomous University of Madrid in Spain, who was not involved in the work. While the NANOGrav data contain hints, it does not quite show the specific correlated pattern that would indicate gravitational waves, and much of the speculation seems premature to him. "I'm the first to hope for primordial black holes," he says. "But I'm afraid it's not yet there."

Nevertheless, the burst of theoretical activity shows how seriously physicists are taking these results. NANOGrav researchers have another two and a half years of pulsar data they are combing through, which could help distinguish whether some or a combination of all these explanations might be viable. They are also working with international collaborators such as the European Pulsar Timing Array (EPTA) and Parkes Pulsar Timing Array (PPTA) in Australia, each of which has observations of other pulsars that could get them closer to spotting the needed correlations to finally pin down the gravitational-wave background—a process that should be underway before the end of this year.

"I would be shocked if we didn't see a signal when we combined all of our data," Mingarelli says. ●

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THE TRUMP YEARS LAUNCHED THE BIGGEST SUSTAINED PROTEST MOVEMENT IN U.S. HISTORY. IT'S NOT OVER.

Here's what we learned by counting the protests during the past four years

By Erica Chenoweth, Tommy Leung, Nathan Perkins, Jeremy Pressman and Jay Ulfelder

During Donald Trump's presidency, the United States saw what were probably the largest and broadest single-day protest events, and the largest sustained protest movement, in its history.

At Count Love and the Crowd Counting Consortium (CCC), we have tracked protests for and against the Trump administration and its policies, along with other local demonstrations, since early 2017; when we began, we explained our methods here at TMC. Through Inauguration Day 2021, we counted nearly 60,000 protests and marches, with 21 million to 31 million participants, as you can see in the figure below.

The most common grievances had to do with racism, policing, the president or presidency (executive), education, guns, immigration and democracy, as you can see in the next figure.

The states that hosted the most protests were, unsurprisingly, the five most populous states: California, New York, Pennsylvania, Florida and Texas.

However, the states with the most protests per capita were Vermont, which had 7.9 protests per 10,000 people, Alaska, Maine, Oregon and Montana; Washington, D.C., surpassed all 50 states with 16 per 10,000.

The states with the fewest protest events per capita, at about one or fewer per 10,000, were Louisiana, Alabama, Texas, Arkansas and Mississippi.

THE LARGEST AND MOST GEOGRAPHICALLY DISPERSED PROTESTS IN U.S. HISTORY

The Trump era included some of the largest and most geographically dispersed protests in U.S. history. The Women's March on Jan. 21, 2017, had 3.3 million to 5.2 million people at 653 U.S. locations, the largest single-day protest in U.S. history. A year later, the turnout was still between 1.8 million and 2.7 million people in at least 407 locations. On March 24, 2018, between 1.4 million and 2.2 million students and their allies joined the March for Our Lives at 763 locations.

Protests were expansive geographically as well. After Parkland, the National Student Walkout on March 14, 2018, included 4,470 schools and universities, which, as we wrote at the time, was the largest number of recorded locations involved in a single-day protest in U.S. history.

In 2020, Black Lives Matter protests spread across thousands of urban, suburban, and rural areas. The maps below show the scale and breadth of this movement compared with the 2017 Women's March.

In addition, these protesters were overwhelmingly nonviolent. In 97.7 percent of events, no injuries were reported among participants or police.

When there were injuries, protesters were injured more often than police, suggesting the police response may have been disproportionate.

COUNTERPROTESTS

In recent months, the political right has begun counter-mobilizing in larger numbers, as you can see in the figure below. In spring 2020, decrying the government's public health restrictions to slow the pandemic's spread, protesters gathered in state capitals, frequently rejected social distancing and masks, and demanded states immediately allow more economic activity. Much of this came after Trump urged protesters to liberate their states.

In response to the Black Lives Matter uprising, some right-wing groups confronted anti-racism activists, while others held Back the Blue rallies in support of the police. Some right-wing counterprotesters claimed to aid police or protect property. According to CCC data, previously fringe paramilitary organizations like the Proud Boys, Oath Keepers and Three Percenters increasingly turned up at these events.

Trump's false claim that he won reelection appears to have inspired many protests. "Stop the Steal" rallies became a weekly fixture, as did counter-protests organized by local anti-fascist activists. The Stop the Steal movement organized three large pro-Trump rallies in Washington, D.C. After the third one on Jan. 6, thousands of rallygoers marched to the U.S. Capitol at Trump's urging. Many then attacked, invaded, and vandalized the building in an insurrection in which five died.

PROTESTS AFTER TRUMP

Will this unprecedented wave of street protest and counterprotest continue under the Biden administration? Here's why we think mass mobilization in some form is here to stay.

First, the left is still mobilized and using multiple avenues to try to shape policy. Many of the progressive groups that organized against Trump have turned their focus to pushing Biden and Democrats in Congress to adopt progressive policies. Indivisible released a handbook for how to influence politicians to improve ballot access. Black Lives Matter created a PAC to have more influence on political and government decisions, while local Black Lives Matter groups continue to hold protests. Groups working on behalf of immigrants and undocumented workers are seeking bolder action on immigration reform, including through protest. Climate

advocates are pressing Biden. When asked about pressuring the Senate on green issues, Varshini Prakash, executive director of the Sunrise Movement, said, “We need to be in the streets” as well writing letters and making calls.

Far-left groups took to the streets in Portland and Seattle on Inauguration Day, vandalizing Democratic Party offices and Starbucks, respectively, to show they reject elites from both parties. Second, the right also remains mobilized and radicalized. The Jan. 6 attack may embolden some armed groups to plan and carry out even more disruptive or provocative actions. Groups organizing ReOpen, Stop the Steal, and “Save America” actions mobilized tens of thousands around Trump’s false claims minimizing the danger of the coronavirus and hyping election fraud. Most Republican senators appear unlikely to convict Trump for inciting violence on Jan. 6.

As Biden’s agenda moves forward, we expect these groups will organize to resist his policies, try to punish GOP defectors, and aim to win back congressional majorities in the 2022 midterms. With few areas of agreement and a now-established pattern of protest and counterprotest, we expect partisan conflict will continue to manifest in the streets at high levels well into the Biden era. Tommy Leung is a software engineer and co-founder of countlove.org, a website that documents local news coverage of U.S. protest activity. Nathan Perkins is a software engineer in natural-language processing and co-founder of countlove.org.

Jeremy Pressman is co-director of the Crowd Counting Consortium and an associate professor of political science at the University of Connecticut. Jay Ulfelder serves as program director for the Nonviolent Action Lab at Harvard Kennedy School’s Carr Center for Human Rights Policy. ●

POLITICIANS QUOTE ABRAHAM LINCOLN A LOT. HISTORIANS SAY THEY DON'T ALWAYS DO HIS WORDS JUSTICE

By Olivia B. Waxman

Whenever there is a time of crisis and uncertainty in America, one thing is certain: Abraham Lincoln is going to get quoted—a lot.

In the wake of the Jan. 6 insurrection at the U.S. Capitol and lawmakers debating on impeaching Donald Trump for a second time during his last days in office, politicians on both sides of the aisle have claimed that the Civil War President would be on their side. When asked at a Feb. 4 press conference “why bother” going through with a second impeachment trial for the former President, House Speaker Nancy Pelosi said “Ask Abraham Lincoln...You cannot go forward until you have justice.” Before Trump’s second impeachment trial started, Republican National Committee chair and Trump supporter Ronna McDaniel urged Biden and Senate Democrats to “heed Lincoln’s words” and forego the trial to “bringing our badly divided country together.” In Dec. 2019, a group of Republicans announced the founding of The Lincoln Project in the last year of the 2020 presidential campaign as an effort to defeat incumbent President Donald Trump and restore the Republican party’s reputation as the party of Lincoln.

As Lincoln’s birthday on Feb. 12 and Presidents’ Day on Feb. 15 approaches, historians look back at the most notable recent uses and misuses of “the Great Emancipator’s” words. According to these historians of the Civil War and Reconstruction, Lincoln might not have been saying what people think.

“You cannot freeze him at any moment. He was evolving during the whole course of his career,” says Eric Foner, a historian at Columbia University. “To try to hold him immobile, you miss the essence of Lincoln.”

Lincoln delivered his often-quoted first inaugural address during a chaotic transition of power similar to 2021's, right after the secession of seven U.S. states that feared he would abolish slavery. "We are not enemies, but friends," he said on Mar. 4, 1861. "The mystic chords of memory, stretching from every battlefield and patriot grave to every living heart and hearthstone all over this broad land, will yet swell the chorus of the Union, when again touched, as surely they will be, by the better angels of our nature."

While many have used this last line as a plea for unity—as quoted by Republican Minority Leader Kevin McCarthy who argued, "our place in history depends on whether we call on our better angels" in a statement against impeaching Trump again—it might not have been the whole of Lincoln's intention. Back then, Lincoln was appealing to people in southern states that hadn't yet joined the Confederacy.

"This is not a speech that's all about conciliation," says Kate Masur, a historian at Northwestern University. "This is a speech that delineates what the sources of the conflict are and says that he believes one side is in the right and one side is in the wrong and he sure hopes that more people won't join the wrong side."

Lincoln's words are often used in the spirit of compromise, though historians say the President was vocally steadfast about his values. He wouldn't back down on the pledge that won him the 1860 presidential election: prohibiting slavery in new federal territories. The seven states that seceded before Inauguration Day 1861 interpreted that policy position as the first step to abolishing slavery altogether.

"Very often...he's being quoted as a conciliator, a compromiser—compromiser in the good sense—someone who could see all sides of an issue and come to some kind of middle way," Masur says. "And I think that really sells Lincoln short and doesn't actually represent what kind of a President he was... He indeed was able to compromise. But he also took very strong stands on controversial issues, especially as the war went on."

This side of Lincoln also tends to get lost when calls for unity quote his second inaugural address from 1865, saying "with malice toward none, with charity for all" and "let us strive on to finish the work we are in; to bind up the nation's wounds." During the debates on

whether or not to impeach Trump a second time, the Republican House Minority Whip Rep. Steve Scalise quoted those lines to argue against a rushed impeachment and for moving forward.

"What bothers me the most is the way in which people today remember Lincoln as mainly a forgiving peacemaker and quote him selectively instead of as the President who made 'total war' upon slavery and understood the Civil War as divine judgement for the national sin of slavery," says Manisha Sinha, a historian at the University of Connecticut.

In that second inaugural speech, Foner notes, "Lincoln is saying with reconciliation must come accountability and justice, that you can't just say, 'let's forget about the past, let's forget about our conflicts and move on.' That wasn't what he was saying at all."

But in the years after Reconstruction, instead of accountability and justice came more injustice for Black Americans.

"The eventual reconciliation, when it came in the 1890s, really was a reconciliation of whites, Northern whites, Southern whites, with racism being a principle that brought them together," says Foner. "The people left out of the reconciliation were Black Americans, whose rights were systematically being stripped away, as white North and white South came to feel a sort of commonality of outlook and interest."

Speaking out on slavery as the real cause of Civil War in his second inaugural speech, and later calling on limited suffrage for Black Americans in his last public address on April 11, 1865, would cost Lincoln his life. Afraid that Lincoln was going to enfranchise all Black men, John Wilkes Booth assassinated him on April 14, 1865.

"He becomes the first American president to publicly endorse Black citizenship, and he's killed for that. That's the Lincoln we don't know and we ought to know more about it," says Sinha.

Americans have looked to Lincoln as an example of a leadership during a national crisis, and he loomed large in the 1930s, whether through a mural commissioned by the Works Progress Administration or in movies like John Ford's Oscar-nominated *Young Mr. Lincoln*, starring Henry Fonda as Lincoln. TIME put writer Carl Sandburg on the cover of the magazine in

1939 because of his new four-volume biography, which portrayed Lincoln as “a manual of political behavior for men in any time.”

“Lincoln is almost more prominent a figure in the 1930s than he was when he was alive and President in the 1860s,” says historian Nina Silber at Boston University and author of *This War Ain’t Over: Fighting the Civil War in New Deal America*. He became “such an important figure for the Depression because he comes from this poor background, and he struggles his way out of it.”

President Franklin D. Roosevelt used Lincoln as the face of the New Deal and, in a 1939 speech, Roosevelt described Lincoln as an “emancipator—not of slaves alone, but of those of heavy heart everywhere.”

“[Roosevelt] doesn’t want it to get too tied up just with issues of race and slavery because that would make Lincoln’s appeal too narrow for what Roosevelt’s trying to do, which is why I think he tries to morph it into, ‘It wasn’t just about slaves; he cared about everybody,’” Silber explains.

During the 1960s, civil rights leaders looked to Lincoln as a representative of a promise of the Emancipation Proclamation still unfulfilled a century after the abolition of slavery, when full racial equality had yet to be achieved. On Aug. 28, 1963, addressing the crowd at the March on Washington from the Lincoln Memorial, Martin Luther King, Jr., kicked off his “I Have a Dream” speech by saying, “Five score years ago, a great American, in whose symbolic shadow we stand today, signed the Emancipation Proclamation. This momentous decree came as a great beacon light of hope to millions of Negro slaves...One hundred years later, the Negro lives on a lonely island of poverty in the midst of a vast ocean of material prosperity.”

Nearly 50 years later, in 2009, former President Barack Obama seized on the moment to symbolize how far the nation had come by taking an abridged version of the train ride Lincoln took to his first inauguration and taking the oath of office with his hand on Lincoln’s Bible.

In his 2021 inaugural address, President Biden quoted Lincoln’s statement on the signing of the Emancipation Proclamation, saying “my whole soul is in it.”

Thavolia Glymph, a historian at Duke University, notes a caveat to Biden quoting Lincoln in this way, pointing out

that while Lincoln was clear about the need to stop the spread of slavery, he was not clear about what a society of full racial equality would look like.

“Standing alone as Biden spoke it, without context, it might appear that Lincoln had always been in favor of a program of uncompensated emancipation and that did not seek the removal of the emancipated; that he had always favored a Union in which Black people would have equal rights. That would be ahistorical,” Glymph wrote in an email. “By Jan. 1, 1863, Lincoln’s heart was in it, but it had taken a lot of work for him to get there. Also, there was no reason for Lincoln to think that the Emancipation Proclamation would unite the country, the meaning implied by Biden. He hoped it would help the North defeat the states that had formed the Confederacy or what Lincoln referred to as ‘the seceded States, so-called.’”

To historians like Masur, true progress also ultimately involves expanding the pantheon of quotable American heroes and talking about American history beyond one-line quotations. After all, the more complicated aspects of Lincoln’s career tend to get “erased” when history is distilled to one-line quotes in a speech, like his role in the largest mass execution in American history, the execution of 38 Dakota warriors in 1862.

“I would like to live in a world where instead of always reaching for the Lincoln quote, people also reach for quotes from women of all kinds and people of color equally often...” says Masur. “The tendency to go to Lincoln or FDR or George Washington or whatever, I find it kind of tiresome, to be honest. Even though granted, Lincoln was incredibly smart and a great writer and super quotable, so I get that. But Lincoln himself was complicated, right? He advocated colonization. He had a hard time imagining what it would be like to have the end of slavery and also racial equality. He came around to that slowly, if at all. There are figures from the 19th century from Lincoln’s era, both black and white, who had more progressive views on slavery and on race—as a white person, take William Lloyd Garrison, as a black person, Frances Harper or Frederick Douglass. These people were much more kind of radical advocates of racial equality and liberation than Lincoln was.” ●

‘RIGHT NOW FEELS SO LONG AND WITHOUT ANY END IN SIGHT’

More than 700 people have been keeping digital diaries as part of Pandemic Journaling Project. It may be the most complete record of our shifting moods in this isolating year.

By Benedict Carey

“Right now. Right now feels like every other minute of the day, of the week, of the month. Right now feels like forever. ... Right now feels so long and without any end in sight, without a change.” — Teacher and mother of four, in her 30s, from Massachusetts.

Those thoughts, typed into a digital journal on May 30, could stand as an anthem for this tragic pandemic year, a cry recognized around the world without explanation or context.

Yet there is plenty of context from this writer, richly detailed and in weekly installments: “We mourn time lost and experiences lost,” she continued, later. “But we remind ourselves often that we don’t have to mourn the loss of life, and for that we are grateful.” She cited a favorite slogan: We were together, I forget the rest.

The entries are among more than 6,500 from some 750 people of all ages and diverse backgrounds who have been keeping digital diaries on the same platform. The Pandemic Journaling Project, a joint initiative of the University of Connecticut and Brown University, began last spring and now contains perhaps one of the most complete records of North Americans’ internal adjustments over months of pandemic, protest and political division.

The story it tells, so far, is a deeper one than the many one-off surveys done last year, which reported predictable increasing levels of distress. The thoughts are a messy, ever-shifting chronicle of psychological adaptation over months of imposed isolation, together documenting a landscape of everyday concerns, emotions and expectations.

“The journals have this stream-of-consciousness aspect,” said Katherine A. Mason, an anthropologist at Brown University who established the platform, with another anthropologist, Sarah Willen, at the University of Connecticut. “You can watch things play out in vivo, how people’s internal dialogues shift over time.”

Expressive writing is often prescribed by therapists to help people process their emotions, when they are too shut down or upset to talk to others. But it is rarely collected and digitized, and open to researchers for analysis. (Selections from the journals are open for public viewing, with the writers’ permission; but proper names and photos are not.)

Outside experts familiar with the project said it may be the first real X-ray into the pandemic’s psychological impact, both individual and communal, and would likely be a resource for years to come.

The germ of the idea for the platform came from an email comment posted by Richard D. Brown, a professor emeritus of history at University of Connecticut, to colleagues last March: “We are not often consciously thrust into history. Now, we are.”

In an interview, Dr. Brown said historians are likely to see the journals as a unique record of ordinary lives, a deep well of self-reflection that should act as a corrective to the mythmaking that is sure to come. “This is the raw stuff of history.” ●

HISTORIANS CORRECT NIKKI HALEY AFTER GEORGE WASHINGTON TWEET

By Darragh Roche

Former U.S. ambassador to the United Nations Nikki Haley has been criticized on Twitter after she claimed that George Washington presided over drawing up the Constitution during his presidency.

"George Washington turned an army of ragtag troops into an unstoppable force that defeated the British & secured America's independence," Haley tweeted on Monday in celebration of Presidents Day. "As President, he oversaw the creation of our Constitution & showed the world what it looks like to govern by the people and for the people," the former South Carolina governor said.

Progressives Push for Joe Biden's \$1,400 Stimulus Checks on President's Day
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Progressives Push for Joe Biden's \$1,400 Stimulus Checks on President's Day

As historians on the social media site were quick to point out, the U.S. Constitution was adopted in 1787 and Washington became the nation's first president in 1789. History professors highlighted the inaccuracies in Haley's post and joked about the number of errors she'd made.

"Historian here, the Constitution created the presidency and not vice versa. But maybe the Continental Army flown into airports managed to reverse time?" wrote Manish Sinha of the University of Connecticut.

Sinha was referring to remarks by former President Donald Trump about troops during the Revolutionary War taking over airports. There were no airplanes or airports in the late 18th century. ●

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HARVARD PROF REJECTS HISTORICAL CONSENSUS ON 'COMFORT WOMEN'

Law professor is accused of ignoring extensive historical evidence in claiming that the "comfort women" were not sex slaves but instead were willing and well-compensated prostitutes.

By Elizabeth Redden

A substantial body of scholarship exists exploring the ways in which the imperial Japanese military forced or

coerced women and girls into an organized system of sexual slavery to service Japanese soldiers before and during World War II. Control over the historical narrative regarding the euphemistically named "comfort women," most of whom were Korean, remains an issue of contention between the governments of Japan and South Korea, as conservative Japanese politicians have embarked in recent years on efforts to deny state responsibility and rewrite textbooks.

Enter into this politicized arena J. Mark Ramseyer, the Mitsubishi Professor of Japanese Legal Studies at Harvard Law School, who wrote an op-ed in a Japanese newspaper describing the "comfort-women-sex-slave story" as "pure fiction." He also published an article in an academic journal, the *International Review of Law and Economics*, characterizing the comfort women as prostitutes, in effect rational economic actors who were able to negotiate and command high wages for their sexual labors.

"Together," Ramseyer concludes the journal article, "the women and brothels concluded indenture contracts that coupled a large advance with one or two year terms. Until the last months of the war, the women served their terms or paid off their debts early, and returned home."

Ramseyer's claims, bearing as they do the Harvard imprimatur, have become the subject of an international controversy. Scholars have cried foul, accusing Ramseyer of overlooking extensive evidence that the "comfort women" system amounted to government-sponsored sexual slavery, not a contract between consenting parties.

The journal has appended an expression of concern to the online version of Ramseyer's article, which is titled "Contracting for sex in the Pacific War." A spokesman for Elsevier, the academic publisher, said the journal is also delaying publication of the forthcoming print issue containing the article to allow for printing of responses in the same issue.

"The editorial team of the *International Review of Law and Economics* has issued an expression of concern linked to the above-mentioned article, to inform readers that concerns have been raised regarding the historical evidence in the article. These claims are currently being investigated and the journal will provide additional information as it becomes available," said the

Elsevier spokesman, Andrew Davis. "The article was originally published online on 1 December, 2020," Davis added. "Although not printed, it is already assigned to the March issue (Volume 65) of the journal and is considered final. The print issue is being temporarily held so the expression of concern, and comments/replies, can be published in the same issue as the original article to give readers access to the fullest possible picture."

Ramseyer declined an interview request, saying he is "in the process of putting together a package of materials relevant to the controversy."

Alexis Dudden, a history professor at the University of Connecticut who said she'd been solicited to write a rebuttal to Ramseyer's article, described his article as "academic fraud" analogous to Holocaust denialism.

"There has been so much scholarship produced in the 30 years since the first survivor came forward and it's almost as if Professor Ramseyer's decision is to just ignore all of the debate -- as if he's the first person to come into this -- and give a withering condemnation of all opinions different from his as lies," said Dudden, an expert on modern Japanese and Korean history.

"To say, 'well, the Koreans were in it for the money' -- which for me would be the tagline for what the Ramseyer article is saying -- is just a dog whistle to a political ideology in Japan that is powerful," Dudden added. "So many who would drag us back to the 1990s are standing up, saying a Harvard professor said, 'This is all a lie. These are prostitutes and they made money and they could go home if they wanted to.' That's not scholarship."

Numerous law societies at Ramseyer's institution, Harvard, have also issued a statement condemning the article and the op-ed, describing his characterization of the established comfort women narrative as "pure fiction" as "a revisionist claim that is recycled time and time again by neonationalist figures."

"Professor Ramseyer's arguments are factually inaccurate and misleading," reads the statement from the Korean Association of Harvard Law School and nine other groups. "Without any convincing evidence, Professor Ramseyer argues that no government 'forced women into prostitution,' a contention he also makes in his editorial. Decades' worth of Korean scholarship, primary sources, and third-party reports challenge this

characterization. None are mentioned, cited, or considered in his arguments." Jeannie Suk Gersen, a law professor at Harvard University who has published on Korean comfort women, said on Twitter that she disagrees with Ramseyer "as deeply as it's possible to disagree."

"For now, I'll say I disagree with his interpretations of his sources, his wrong legal analysis, and even applying his own disciplinary terms, his reasoning fails," she wrote. She argued that "no legal system would recognize or justly enforce contract of this nature" and noted the "crucial historical context" that Korea was under Japanese imperial rule at the time.

"Ramseyer recognizes the women were not free to walk away until they fulfilled the 'obligation' to have sex with thousands. In other words there was no possibility to breach the 'employment contract' as there would be [in] a just contract system. That is the definition of slavery," Gersen wrote.

"Therefore by his own logic, contract analysis is wrong analytically, apart from a question of moral outrageousness. His use of contract smuggles in agency but historical evidence from responsible scholars has indicated the agency normally associated w/ contract didn't exist." Harvard's media office did not return an emailed request for comment Monday. ●

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BEHIND THE SCENES: HOW A GROUP OF SCIENTISTS MADE UCONN ATHLETICS POSSIBLE THIS SEASON

By Mike Anthony

The NCAA samples-only refrigerator sits in a controlled access area of UConn's Engineering & Science Building at the heart of campus, a few hundred yards from the Werth Champions Center and other prominent athletic facilities.

On most days, it is filled with bags containing hundreds of vials of saliva by 10 a.m. That is generally the time of transition from collection to analysis in an elaborate COVID-19 testing program that allows UConn athletes to break some shackles of a pandemic and compete in the eerily empty arenas of 2020-21.

“We try to distinguish between spit and drool,” said Dr. Deena Casiero, UConn’s director of sports medicine. “We don’t want people to spit in the tube. That makes bubbles. You just drool. We teach kids all these tricks. Think about something delicious, something that makes you salivate. Or think about sucking on a lemon or lime. Then they bring the tube to their mouth and just let liquid pour out.”

That’s how this painstaking process begins, with UConn basketball players, hockey players, football players — you name it — simply drooling on cue to begin their program’s designated testing days. They can’t eat or drink for 30 minutes prior and when samples are tinted, say, orange, well ... Reset the clock. Back in line. No Powerade, remember.

The saliva tubes move across campus all morning, the athletic training staff scrambling to collect and deliver. The fridge is the hand-off point to a lab of six scientists — doctors, professors, graduate students among them — who while wearing hoods and bio safety gear run a cost-effective, seven-day-a-week analysis that identifies the SARS-CoV-2 gene.

UConn’s COVID-19 lab conducts up to 340 individual tests a day for the athletic department alone, in addition to the 5,000 it runs daily through pool testing for the university population at large. More than 10,000 tests have been performed for the athletic department since the current protocol was put in place in October.

Without this process and the effort of those involved, UConn sports at this time would be impossible.

The cost of athletics testing in this system is under \$100,000, with each test costing under \$10. That is far less expensive, with a quicker turnaround time, than services offered by off-campus labs. Costs to the lab for testing the student population at large, university professor and lab coordinator Dr. Rachel O’Neill said, is hundreds of thousands of dollars versus the millions it would have been with the use of off-site labs.

The RT-qPCR test (quantitative reverse transcription) includes cycles of heating and cooling, the mixing of samples with fluorescent dyes and enzymes that turn RNA into DNA and so much more in areas not necessarily covered by Science 101. Clear your mind of Bunsen burners. The testing method begins with a machine receiving a 96-well plate of vials, which rests on an inversely shaped Peltier heating block so samples rise to just shy of a boil — 95 degrees Celsius.

There is enough involved to fill a textbook but the bottom line is this: Student-athlete saliva samples are tested for a human control gene, to make sure the sample is actually saliva, and for the COVID-19 gene. Samples are cycled through the machine 40 times over the course of about two hours. Results are automatically documented and assigned to student-athletes with a bar code system that begins with players labeling their tube and logging into a website before they drool.

“It does produce a cycle threshold,” Casiero said. “The lower the cycle threshold, the more positive the sample. The higher the cycle threshold, that means the longer it took to produce the positive, which translates to a lower viral load. That’s an important piece of a data for me as a clinician, because what somebody’s cycle threshold tells me is how many copies of virus they have circulating in their system, which translates to how infectious they are and potentially how contagious they are. It’s a high-level test. It’s the gold standard.”

Test results are usually returned to Casiero between 4-6 p.m., a manageable turnaround time for athletic endeavors dependent on timing nearly as much as accuracy. From there, Casiero shares results with administrators and program members. And she coordinates, when the need arises, the necessary response to any positive results.

This is the intersection of sporting ambition and medical judiciousness. It is complicated.

The pandemic has created a collision of hope and fear and reality. Science, and the light it sheds on student welfare and transmission risk for group activities, has seeped deep into an athletics world that, traditionally, runs largely independent from other campus divisions.

Athletic goals are real. The games and experiences matter. Some semblance of a normal life is constantly pursued for student-athletes.

Disruptions are real, too. The UConn men's and women's basketball teams have had numerous games postponed due to COVID issues within their program, or within an opponent's. Each program has been shut down for 10- or 14-day periods for positive tests. The entire football season was canceled, due in part to coronavirus.

Casiero is at the heart of operations and conversations that affect every arm of the athletic department.

"It's a struggle, I think, every day," Casiero said. "But what I lean on is, my job is to take care of the athletes. My job is to make the decisions that I think are best. The nice thing about what's been happening is that we haven't seen many kids get sick. You see athletes get diagnosed with COVID. But very few of them go on to severe disease.

"I will tell you, if that weren't the case, then things would be very different. If every kid I diagnosed with COVID, I had to send to the hospital because they were in respiratory distress, we would not be where we are in athletics right now. I wouldn't have worked so hard to keep this going if kids were getting sick. I think that would have changed the entire way I attacked this. But, luckily, kids are faring pretty well."

The lives of 650 student-athletes are affected by data provided by the lab.

"David has been so wonderfully patient in understanding the complexities of what we have to do," Casiero said of athletic director David Benedict. "I've had to make decisions that don't always make coaches and players and administrators happy. But at the same time, I believe David fully respects me and how I have handled this really difficult time."

Every day for doctors, players, coaches and others is a tip-toed walk on COVID eggshells and yet UConn has managed to make it this far, nearly a year after the world changed, with its teams resilient and seasons largely intact. That speaks to the power of ingenuity and a campus-wide cooperation that demands so much of so many, and a vast communication network upon which the entire testing program is based.

"There are definitely times where we've all just hit a wall and been like, 'This is so exhausting, and it's never stopping,'" said O'Neill, a professor in UConn's department of molecular and cell biology who is among

the lab's lead coordinators. "But at the end of the day, as soon as we get results and are reporting, and are reminded that they're people and students and we're doing this for the university, it's really hard not to be like, 'It's OK. This is great.'"

AN INCREDIBLE WEIGHT TO CARRY

The testing program has required various members of the athletic and academic communities to double their pre-pandemic workload in efforts to keep student-athletes healthy and compliant with NCAA guidelines. Also, some scientists have had to put on hold various academic initiatives.

Everyone involved is sacrificing, from student-athletes living bizarre lifestyles of constant testing and periodic isolation to the local delivery person who makes sure the lab has enough supplies.

Casiero and trainers haven't stopped treating sprained ankles and concussions. But since mid-March, the lives of the UConn athletics medical and training staffs have been unimaginably strained.

Dealing with a virus with potential for long-term health implications or symptoms that aren't yet fully understood, accepting responsibility for the health and safety of student-athletes and a campus community at large, setting courses of action that are supposed to carve a path to the next game through a pandemic ... that is an incredible weight to carry.

"I always knew I was a strong person, but the past 11 months have proven even to myself how strong I am," Casiero said. "Because this has been brutal. ... It's definitely up and down for me. But if I had to summarize, the most difficult aspect is that we're dealing with a novel virus where we don't have the data. As a medical professional, almost everything I do, the foundation is in sound medical data with years and years of data to support decisions. For the last 11 months, every healthcare provider in the country treating COVID or managing COVID has been operating in an area that we, as physicians, are not usually operating in. We do not have a [complete] set of data to back up decisions. You have the CDC and you have the local department of public health to lean on.

"I oftentimes feel that I just have to make the best decision I can with the data that I have, and when I go to people like David with an explanation for that

decision — to a non-medical person the concept is foreign. When you talk to coaches and administrators, things are black and white, X's and O's, wins and losses. In medicine, things are not black and white. That has been the most difficult aspect of what I've been doing, navigating uncharted territories.”

A KEY ASSIST FROM YALE

The most important “roster” on the UConn campus is as follows: O'Neill; Dr. Kendra Maas, a facility scientist in microbial analysis; Dr. Lisa Nigro, a postdoctoral fellow in microbial analysis; Gabriel "Gabe" Salles and Lucy Owusu, graduate students in the health care genetics program; and Ben Robinson, an M.S. UConn graduate.

They run the lab that a university leans on.

Dr. Ellyssa Eror, the medical director of student health and wellness at UConn, heads care for the general student population. Casiero heads medical care for the student-athlete population. They work closely together in areas of COVID management and care.

Through various testing methods in the 2020-21 academic year, 1,159 general student population tests (residential and off-campus Storrs, and residential Stamford) had returned positive according to data updated Wednesday. There were 124 positive student-athlete tests since March.

Thirteen days is the longest Casiero had to wait for a student-athlete's tests results as the early stages of the pandemic raged and the medical community was overwhelmed. That is untenable in the world of athletics, particularly in season. UConn's system of swab testing, in association with Quest Diagnostics, met basic needs for many months with campus virtually empty.

But with students set to return and sports seasons on the horizon, anything outside of consistent 24-hour turnarounds would be less than ideal — because the next practice or the next game is almost always the next day. Casiero needed a testing system that would be fiscally manageable and wouldn't overburden her staff. And she needed fast results.

O'Neill's lab had made progress with pool testing — where 10 samples are tested simultaneously, with individual tests to follow only if the pool is positive — and thought the approach could apply for athletics. It could not, Casiero concluded, even while in a desperate

search of new approaches and considering partnerships with numerous labs across Connecticut and Massachusetts.

The fact that O'Neill's operation was on campus was perfect. But with the pool testing that was being pitched, Casiero knew the additional time needed for follow-up individual tests triggered by any pool positive would only complicate athletic planning.

The situation changed with the introduction of SalivaDirect testing — developed at Yale and granted emergency use authorization by the FDA in August. That would work, Casiero knew. It was in line with NCAA guidelines. O'Neill and Maas prepared their lab to run the protocol, all the while continuing with pool testing for the general student population that remains in use today, and were operational with a new testing model for the athletic department in October.

All in, the lab has conducted hundreds of thousands of COVID tests since the pandemic began.

A RACE TO LOAD UP THE FRIDGE

For the athletics segment to play out properly, there is a race to get drool collected and delivered. If the samples are not delivered to the lab by 10 a.m., it's asking a lot for scientists to produce results in the needed time frame.

So the collection process is a race to load up the fridge. “The panic is when we send over a number to the lab, like, ‘We're dropping off 289,’ and the lab lets us know an hour later they only have 284,” head athletic trainer Bob Howard said. “Everybody scrambles, goes back through their numbers. You counterbalance. ‘OK, everything is accounted for.’ But sometimes it isn't. We work in synchronicity, very close with them. They're rock stars over there at the lab. They have come through in such a way to help us.”

On testing days, trainers set up a table at the team's facility. All Tier 1 program members - players, coaches, managers support staff, medical staff, members of the travel party, others - line up. The trainer has a bag of empty vials and a bag of labels, each of which features a QR barcode as part of a system designed by the UConn lab, primarily Maas. A player is handed a label and scans the code with their phone, prompting a website. The player then enters their NET ID and a password, which identifies them in the UConn system, and the player

confirms that the codes on the label and site match. They affix the label to the vial and they drool into it, being sure to fill it past the line marking 1 CC, or 1 milliliter.

“Just the other morning, someone’s sample was all blue,” said Howard, who works with the football team. “I was like, ‘Did you just brush your teeth?’ They said, ‘Yeah, Bob. I’m sorry.’ I said, ‘You know this isn’t going to work. Go dump that, rinse your mouth, wait 30 minutes. Let’s go.’”

Largely, though, it’s a relatively smooth process. It beats the invasive nasal swab, a process endured by athletes for months. It also beats waiting days for results.

Once the vials are filled and capped, a member of the training staff walks or drives the samples to the Engineering & Science Building, loads the fridge and sends a text message to scientists in the lab down the hall. And the analysis begins.

Testing takes place three times a week for basketball teams and hockey teams, twice a week for football and at least once a week for other sports (tests are added before and after road trips). Any positive tests are re-tested to confirm.

“If we weren’t dedicated, we would have turned around and walked away a long time ago, but we’re in it,” Casiero said. “And I’m so proud ... of my medical staff, how vigilant they’ve been through this whole thing. And I think the athletes really appreciate it. I’ve gotten cards, messages, from athletes thanking me for doing what we’ve done to allow them to do what they love. To be honest, that’s what makes this all worth it. You can be so stressed and so tired and so frustrated, and then I get an email from an athlete saying, ‘I was able to play hockey today because of how hard you worked.’ It’s those types of things that make it worth it.” ●

HOW TO PASS LEGISLATION IN THE SENATE WITHOUT ELIMINATING THE FILIBUSTER

By David E. Repass

There is much confusion about the filibuster these days. Many say that we need to get rid of the filibuster if any substantive legislation is going to get passed in the Senate in the coming years.

This confusion is due to the lack of understanding of a process which blocks legislation — a process which is incorrectly called a filibuster. There has not been an actual filibuster since the 1960s. An actual filibuster is when a Senator (or a group of Senators) take the floor and talk continuously for hours, days, weeks and even months. This was famously illustrated by Jimmy Stuart in the movie "Mr. Smith Goes to Washington."

Let us look at the process that was used by the Republicans to block almost all legislation in President Obama's first two years. The Democrats had majorities in both houses of Congress and the presidency, yet the Republican minority found a way to block them. As each piece of legislation came over from the House, Senate Minority Leader Mitch McConnell (R-Ky.) would tell Majority Leader Harry Reid (D-Nev.) the Republicans were going to filibuster it.

Reid was afraid that these threatened filibusters would actually take place and would slow down the work of the Senate too much. He therefore set out to formulate legislation that would have the support of 60 Senators — the number necessary to stop a filibuster under Rule XXII, or cloture. He sought legislation that he thought would be "filibuster proof" before he would introduce it.

In essence, by simply threatening to filibuster, McConnell was able to block legislation without lifting a finger. No Republican senator had to make the effort of standing on the Senate floor filibustering for days and the public had no idea why nothing was getting done.

Reid did manage to get two major pieces of legislation passed during President Obama's first two years — the Dodd-Frank Wall Street Reform Act and the Affordable Care Act. But both of these were heavily watered down to get 60 vote support. For example, the major problem that Dodd-Frank needed to deal with was "too big to fail." But the watered down Act was weak and big banks are now bigger than ever.

The key to understanding how to defeat the threat of a filibuster is not to succumb to it as Reid did. This time, when McConnell threatens to filibuster, Senate Majority Leader Charles Schumer (D-N.Y.) should take the bill to the floor and reply to McConnell saying: 'Go ahead and filibuster. You are welcome to get on the Senate floor and tell the world that you are objecting to preventing global warming, providing health care, reforming immigration, establishing a living wage, assuring voting rights,' or whatever the Democratic proposal might be.

An actual filibuster will ensue and will go on; possibly for a month or two. All filibusters in history have ended sometime — the longest filibuster lasted 60 days when the 1964 Civil Rights bill was held up. Sooner or later, all filibusters will fizzle and a simple majority (51 percent) can then pass the legislation.

Filibuster proposals should be taken up one at a time to avoid massive resistance to a massive set and to allow concentration on one issue at a time. There should be a one month break between submission of bills to allow other Senate business to be taken care of.

Let us suppose the worst-case scenario: two months of actual filibustering each bill plus the one month break. Seven bills could be passed in 21 months — seven bills before the 2022 congressional election. Democrats would have this impressive list of major accomplishments to show to voters. This method of beating the blocking will take patience and teamwork. But it will achieve solutions to many problems that have been awaiting action for decades and the Democratic party will be given the credit.

In order for this to work, several things are necessary:

- The Majority Leader must be able to get a bill to the floor of the Senate, ready to be debated. Herein lies a major point of blockage — the motion to proceed. This motion, which can be filibustered, means that a minority of 41 can stop a bill from even being considered. This

highly undemocratic motion must be eliminated from Senate procedures using the 'nuclear option,' if necessary.

- The absurd practice of upside-down cloture, or calling for cloture before the debate even begins, needs to be eliminated. Use the nuclear option, if necessary.
- During a filibuster, Republicans will most certainly suggest an absence of a quorum again and again, at any time of day or night. This is how they will try to wear the Democrats down. A quorum in today's Senate requires the presence of 51 senators. All 48 Democrats, plus the two Independents who caucus with them, will have to be available at a moment's notice to meet the quorum call. They will have to make the sacrifice and endure the inconvenience of living and working in their offices. All Democrats will have to be team players. This will be a test of Democrats' ability to work together and get things done.

In Nov. 2013, exasperated by the constant threat by Republicans to filibuster confirmation of the president's nominations to executive and judicial positions, Reid used the nuclear option to remove these positions from being filibustered. Later, McConnell used the nuclear option to exempt Supreme Court justice nominees from being filibustered.

When Donald Trump became president in 2017, there were a great many judgeships left unfilled. President Trump went to work filling them with extremely conservative and often unqualified judges. Since judicial appointments could not be filibustered, there was nothing the Democrats could do to object to these appointments. And when Ruth Bader Ginsburg died, there was no way to slow the confirmation of the Trump nominee until Joe Biden became president.

Finally, it should be kept in mind that a fundamental principle of democracy is majority rule. But along with majority rule must come minority rights — the right of the minority to be heard. Pure majority rule without minority rights gives the majority the power to ride roughshod over the minority — this is "tyranny of the majority." The filibuster is a way to assure minority rights. When the minority is left out in the cold (not included in deliberations) anger and resentment is fostered, thus greatly reducing the possibility of comity between the parties.

David E. RePass is an emeritus professor of political science at the University of Connecticut. He is the author of, "Listening to the American Voter: What Was On Voters' Minds in Presidential Elections, 1960 to 2016." ●

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BROOD X CICADAS ARE ABOUT TO PUT ON ONE OF THE WILDEST SHOWS IN NATURE. AND D.C. IS THE MAIN STAGE.

'We are at the epicenter of an event that happens nowhere else on the planet,' an entomologist said. 'It blows your mind.'

By Darryl Fears

They've been buried — alive — for 17 years.

And now, Brood X, one of the world's largest swarms of giant fly-like bugs called cicadas, is ready to rise. When the ground warms to 64 degrees, they'll stop gnawing on tree roots and start scratching toward the surface by the hundreds of billions.

Georgia and other Southern states will probably be where they first emerge around the end of March, experts say. But residents of the Washington area are standing at ground zero. The District, Maryland and Virginia are likely to host more of these animals than any other of the 14 states that share the experience.

Brood X is expected to emerge in more than 200 counties across the Mid-Atlantic, Midwest and South this year. It is one of 15 periodical cicada broods found in the U.S.

"We are at the epicenter of an event that happens nowhere else on the planet except here in the Eastern United States," said Mike Raupp, a University of Maryland entomologist who travels the country giving speeches about cicadas.

"It's going to be pretty remarkable, come the latter half of May," Raupp said. "The densities of these things is going to be phenomenal, about 1.5 million per acre. It blows your mind."

If you imagined there were more birds outside your windows last spring because of the pandemic quarantine, you haven't seen anything yet.

Cicadas are a Thanksgiving-like feast for wildlife. As they emerge, birds, squirrels, chipmunks, skunks, ants, raccoons, snakes, frogs and possums will gorge themselves for about a week until they collapse into food comas.

"What people will actually see is animals eating bugs," said Gaye Williams, an entomologist for the Maryland Department of Agriculture and an avid cicada watcher.

Yes, she said, your dog will eat cicadas if given the chance.

"It's very much like when you go to an all-you-can-eat crab feast," Williams said. "The very first bunch that you throw down on your table, everybody grabs crabs and you start cracking them, and you take every last molecule of crab meat. About the fourth tray ... people only take the claws. As this orgy of eating goes on, there are animals that actually won't touch them anymore. They're full."

The sacrifice of a few thousand lives won't faze Brood X. It will carry on with its single-minded purpose: courtship, sex and hatching the next generation of cicadas.

After tunneling their way out of the ground near tree trunks, they'll crawl up trees, or things they mistake for trees, and shed a thin shell from which they emerge as Technicolor animals with big orange eyes and wings.

The males will start mating songs that reach up to 100 decibels. "That's the sound of a chain-saw, a lawn mower, a jet overhead," Raupp said.

And then they will get busy. To paraphrase an old hit song, they will do it like they do on the Discovery Channel — in trees, on your patio, your porch, your yard, your roof and your car. It might be a good idea to keep the windows closed.

Humans will see an undifferentiated mass of bugs. But in reality, Brood X is composed of three species — *Magicicada septendecim*, *Magicicada cassini* and

Magicicada septendecula. They'll sort into different trees and make three distinctly different male songs.

Adult cicadas die after intercourse. Females stick their eggs into the branches of trees, then keel over. The eggs hang out for a while, then hatch, and the nymphs fall to the ground and dig down to a nice tree root, which they nibble on for 17 years.

The process is somewhat harmful to trees, said Eric Day, an extension entomologist at Virginia Tech. He recommends that farmers and homeowners not plant saplings until July, when all the cicadas in the area have died.

"One female can lay 10 to 20 eggs," he said. "She makes a long cut on [a] twig and deposits them." The eggs are tiny — but do the math, he said. There are billions of females. The last time Brood X appeared, Greece was preparing to host the Olympics, Barack Obama was a state senator in Illinois, and President George W. Bush was fighting for a second term.

Brood X has experienced a bit of fame. After emerging in 2004, its members could be heard during the nationally televised Memorial golf tournament in Dublin, Ohio, featuring Tiger Woods and other pros. At one point, Woods could be seen looking at the trees, amazed by the waves of sound.

Cicadas also made an appearance on "The Tonight Show With Jay Leno" when Brood II emerged in 2013. On one night, Raupp, who might be best described as a cicada whisperer, famously fed a bug to the host. Raupp offered a bite to actor Russell Crowe, seated to his right. Crowe declined.

"I'm going to eat some cicadas," Raupp said. "Boiled, fried on skewers." Christine Simon is planning to drive from Connecticut to Georgia to check them out. The Washington area will be one of her first stops. Simon, a professor of ecology and evolutionary biology at the University of Connecticut, has studied their languages.

"The song of the first species sounds like a flying saucer landing from a 1950s science fiction movie," Simon said. "The middle species sounds like someone took water and threw it into hot oil. The third one sounds like an angry squirrel."

Simon expects to find a ton of cicadas along the banks of the Potomac. "I think they're in Rock Creek Park," she said. "I'm not absolutely certain, but I think they are."

If you want to help locate cicadas for science, there's an app for that. It's called Cicada Safari and it's free. When you see cicadas, you can snap a picture within the app that will automatically go to Mount Saint Joseph University in Cincinnati, Simon said.

There, a team of students will map them for future study and to show cicada lovers where they are. The University of Connecticut maintains a map of Brood X.

Simon and Raupp will take you to school on periodical cicadas. The animals that emerge in the present day date back 3.9 million years. They split into different broods about half a million years ago. Twelve broods, like Brood X, emerge every 17 years, and three every 13 years.

A small number of annual cicadas appear yearly and are hardly noticed. Sometimes, 17-year cicadas jump the gun because of climate change. Millions of Brood X cicadas bore to the surface in 2017 a bit too early in Herndon, Va., in Wolf Trap National Park for the Performing Arts and along the Potomac to Reston.

That was Brood X four years early, Simon said. Early cicadas are essentially devoured by predators.

"I'd say twice as many were still underground," said Simon, who's observed cicadas since 1974. "That lowers the numbers."

Humans have also reduced the swarm's population. First the colonists cut the trees the bugs need, clearing land for expansive farms. Then developers built houses, business centers and shopping centers over surfaces where they emerge.

Invasive species of birds brought by humans picked off more than their fair share. Squirrels introduced to cities near the turn of the last century by urbanites who craved wildlife became a predator cicadas hadn't faced.

On top of all that, said Williams, the Maryland entomologist, a natural fungus attacks male cicadas in the most personal way. "They can't mate if they've got the fungus," Williams said. "They got, what's it called, no junk. It's laying on the ground somewhere."

The fungus looks powdery, brown like cinnamon. It goes after the abdomen and infects other cicadas when it sprinkles as the afflicted bugs fly. "If you search 'Flying Salt Shakers of Death' you can learn more about it," Williams said. "Oh my God, it's incredible."

Males transfer it into the eggs of females in their sperm, infecting the next generation. Cicadas went extinct in Connecticut and northern Florida, and have dramatically declined virtually everywhere, especially in Georgia and other Southern states. Some people are happy about the decline. They dread cicadas as much as they do spiders or any other type of creepy crawly.

But cicadas have a legion of fans who travel to see them. There is such a thing as cicada envy, people who are peeved that the bugs don't show up where they live. Parents take their kids to watch them the instant they push out of the earth, making a tiny dirt cone.

"If you're in a place where they were in 2004, there's going to be a magical evening; right around sunset you are going to go out, and there will be hundreds of thousands of these things emerging from their crypts, marching in column," Raupp said.

"And if you stand still, they will climb up you and shed their skin." If you miss them somehow, be patient. Brood XIX, the largest known swarm with the widest range, is coming in 2024. ●

sign of the prolonged disruption that the ongoing public health crisis has wrought on nutrition programs.

Anti-hunger advocates and nutrition officials applauded the move, and made renewed calls on policymakers to keep school breakfast and lunch free even after the Covid-19 public health emergency ends. The bulk of their argument is that doing so would increase access to nutritious food, reduce stigma, and cut down paperwork for schools—advantages that are all the more welcome during a crisis that has led to increased unemployment and food insecurity. Now, newly published research is also finding that universal free meals could also help schools save money.

Let's back up a bit: Before the pandemic was declared, USDA only permitted some schools to serve meals to all kids at no cost, under a program called the Community Eligibility Provision (CEP). To qualify, a school's student body had to meet a high poverty threshold. As it turns out, this model might be helping schools nutrition programs become more cost efficient. In a paper published last month, public health and food policy researchers found that CEP schools tended to see lower per-meal costs, possibly due to higher participation rates that helped distribute fixed expenses across a larger group of kids.

"The schools with universal free meals were able to serve meals at a lower cost while maintaining the same nutritional quality."

"Let's say somebody needs to make a pot of pasta," said Michael Long, a study author and assistant professor of community health at George Washington University. "[School food services] can dump in another package of pasta, but it's still the same giant pot, and it's still the same amount of time to boil it So if they could get 10, 20, 30 more kids eating from that same pot of pasta, they would drop that per student cost of pasta because the labor would stay the same and there'd be marginal changes in food costs and other related costs."

Specifically, Long and their co-authors found that schools participating in CEP spent 67 cents less per lunch, compared to schools that qualify for CEP, but for whatever reason did not opt into the program. They also found that those same schools spent 58 cents less per breakfast. Included in the study's full accounting of costs were food, labor, and the administrative support

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THE PANDEMIC HAS MADE UNIVERSAL SCHOOL MEALS THE NORM. THIS MODEL COULD HELP CAFETERIAS SAVE A LOT OF MONEY OVER TIME.

By Jessica Fu

The Department of Agriculture (USDA) on Tuesday announced it would extend waivers allowing schools to serve free breakfast and lunch to all children through the end of September, maintaining what has become a de facto universal school meals program. This is the fourth time these waivers have been extended—a

needed to keep food service programs running. Importantly, the healthiness of meals didn't vary.

"The schools with universal free meals were able to serve meals at a lower cost while maintaining the same nutritional quality," said Long. (Researchers observed healthiness via what's known as the Healthy Eating Index, a measure that assigns diet quality scores to different meals.

"Reimbursement rates that we have are pretty low, especially with what happened last year when inflation rates were much higher than historical rates and costs increased due to Covid-19. It's just a challenge."

The research was conducted on a large batch of nationally representative data collected by USDA about how school food programs operate nationwide, including through surveys with school officials and families. This study was funded by the Robert Wood Johnson Foundation, a public health advocacy group.

The authors emphasized that they'd like to conduct more research to further parse the relationship they observed. Nonetheless, the findings are particularly resonant right now, as school food services grapple with budget deficits caused by the pandemic.

Notably, the cost-savings only applied to medium- and large-sized schools, as defined as those with more than 500 students. The researchers didn't observe the same pattern for smaller schools, which they theorized might be attributable to savings associated with economies of scale.

This new research suggests that schools may also be in the position to further stretch every dollar if a permanent universal school meals program was in place.

While USDA pays school districts back for each meal they serve, exact reimbursement rates vary depending on factors like region and poverty. Since last spring, nutrition officials have been calling on the federal government to significantly increase these rates, in addition to providing stopgap funding to cover budget shortfalls. This new research suggests that schools may also be in the position to further stretch every dollar if a permanent universal school meals program was in place.

"We know that healthier food costs more," said Tatiana Andreyeva, associate professor at the University of

Connecticut who specializes in food policy, and another co-author of the study. "Reimbursement rates that we have are pretty low, especially with what happened last year when inflation rates were much higher than historical rates and costs increased due to Covid-19. It's just a challenge."

Although this study was conducted on data collected before Covid-19 hit, it might not have come at a better time: Officials right now are already deliberating yet another extension of pandemic waivers, which would keep meals free for all kids through the 2021-2022 school year. According to Politico, Secretary of Agriculture Tom Vilsack told nutrition officials at a virtual conference Tuesday that a decision would be made by the end of April. ●

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HOW TO SET BOUNDARIES WHEN STARTING A NEW JOB

By making time to recharge and reset, you'll avoid burnout and show up as your best self.

By Rebecca Muller

Setting boundaries to protect our well-being at a new job can be challenging, especially when working from home. With hustle culture telling us we need to work overtime to get ahead, taking time for ourselves can easily become an afterthought. "At a new job, we feel like we are on trial and need to be on our 'best behavior,'" Rachel Goldman, Ph.D., FTOS, a clinical psychologist, tells Thrive. Plus, we might not know about the team's norms and culture when we're not physically in the office. "Being remote can leave you feeling confused as to what you are supposed to be doing and disconnected from the group," adds Sherry Pagoto, Ph.D., a clinical psychologist and University of Connecticut professor.

However, putting guidelines in place is crucial when it comes to avoiding stress and burnout. "If we remember

that self-care is necessary in order for us to be at our best,” Goldman adds, “we need to set certain boundaries in order to work efficiently.” If you’re struggling to set boundaries in your new role, here are a few tips to help you get started:

1. START A DAILY CHECK-IN WITH YOURSELF

When we start a new role, we can get caught up in the day-to-day busyness of our to-do lists and projects. And oftentimes, a crowded schedule leaves little time for any sort of boundaries. Goldman suggests taking time each day to check in with yourself. “It’s important to first ask yourself what you need to be the best you,” she says. “Take a look at your daily routine and ask yourself what your health behaviors look like — from your sleep, to your hydration, to your movement.” When you take a moment to self-assess each day, you can see which areas of your routine need some boundaries, and then set them accordingly.

2. TALK TO YOUR MANAGER ABOUT YOUR HOURS

One aspect of remote work is that you may be communicating with colleagues in different time zones, which can interfere with your established working hours. “If you are working across time zones, learn the norms about how this works,” says Pagoto. “Most companies have norms about how people across time zones can work together.” Have an honest conversation with your manager about the expectations for working hours and be upfront about your own boundaries. “If you feel like you need to be front and center from 8:00 a.m. to 9:00 p.m., you will burn out fast.”

3. TAKE SMALL SELF-CARE BREAKS

It can be tempting to power through a new project or brainstorming session without taking a break, especially when we’re eager to impress our new colleagues. But stepping away from our desks even for a short time can increase our productivity. “Find pockets of time throughout the day for some ‘me time’ or self-care,” Goldman suggests, “whether it’s taking a break when you get off a Zoom call to take some deep breaths, or having a mindful minute while you are making your lunch.” When you take time for real breaks that benefit

your well-being, you’ll find that you’ll be even more efficient when you return to your work.

4. BE MINDFUL OF YOUR PHYSICAL WORKSPACE

Establishing clear boundaries with your work includes having a distinct workspace, Pagoto explains. “Having an office space at home and a structured workday is very important for drawing boundaries between work and home,” she says. “A kitchen table isn’t ideal, not only because of disruptions but also because it erases the lines between meals and work.” By being intentional about where you’re working, you can designate one area as your workspace, and then physically separate yourself from it at the end of the day. ●

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OUTRAGE GROWS OVER WARTIME SEX SLAVE CLAIM

By Lia Zhu

Free speech no cover for denial of 'comfort women' abuses: academics

US scholars have moved to shut down any suggestion that the concept of academic freedom gives cover for claims by a Harvard University professor that whitewash Japan's wartime sexual enslavement of women from many countries.

Before and during World War II, hundreds of thousands of girls and women were forced into the Japanese military's sexual slavery system. They were euphemistically called "comfort women".

But Mark Ramseyer, Mitsubishi professor of Japanese legal studies at Harvard University, claims that these women willingly contracted themselves into sexual servitude. He penned these views in an article titled Contracting for Sex in the Pacific War, published online

in December by the International Review of Law and Economics.

The paper in the academic journal raised a "serious question: Can academic freedom be used as a shield to allow the violation of the academic code of conduct?" Peipei Qiu, a professor of Japanese and Chinese at Vassar College, said at a recent webinar.

One of the most "unacceptable" aspects of the article is that the author "frequently put out assumption as a conclusion", without providing supporting evidence, Qiu said.

Qiu said the article claimed the Japanese military didn't need additional prostitutes because they had plenty, but historical documents—including those produced by the Japanese military itself—prove the opposite. "In the past decades, transnational investigations in multiple countries have demonstrated that extremely large numbers of women were drafted into Japanese military comfort stations by force, by coercion or by deception, and the majority received no monetary payment," she said.

"Research findings like this are all available in English when Professor Ramseyer wrote his article, but he simply ignored them."

Michael Chwe, an economist and professor of political science at the University of California, Los Angeles, said Ramseyer's paper also used economics, game theory in particular, to "deny an entire historical atrocity—the equivalent of Holocaust denialism".

He wrote an open letter to condemn the article, which was rapidly endorsed by academics around the world. The letter garnered about 1,000 signatures in the first week, Chwe said. So far, nearly 3,500 people have signed the letter, including more than 1,800 economists.

"The main issue is about education. This is something that we all, as educated human beings, should understand and should know about," said Chwe of his reason for circulating the letter.

FLAWED ASSUMPTIONS

Richard Painter, professor of corporate law at the University of Minnesota and former chief White House

ethics lawyer, said game theory assumes usually rational actors and bargaining power.

In the case of "comfort women", Painter said, those women and girls, some as young as 10 years old, lived in a region that was occupied by Japan in wartime. "How can a professor of law and economics, or any educated person, opine that a woman can enter into a contract in such conditions?" he said.

"Fake scholarship is as damaging as fake news, because when a professor at a renowned university pronounces a fact, the press will pick up on that, particularly if the press wants to push a certain agenda in advancing that narrative," he said.

Alexis Dudden, a history professor at the University of Connecticut, echoed his concerns. "This is an era of disinformation and misinformation, and somebody's dressing up fake news as fact and calling it scholarship," she said.

"That's our responsibility to call out and say: This isn't academic freedom. You don't get academic freedom if you aren't honest with your evidence, and there's no evidence." ●

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NOISY CICADAS ARE EMERGING EARLIER

More and more broods are crawling out of the ground sooner than expected

By Chelsea Harvey

States along the East Coast are preparing for a rare and spectacular natural phenomenon. As spring sets in and the soil warms, the ground will erupt as billions of cicadas burst from the earth.

It's an event nearly two decades in the making. Known as Brood X, this massive swarm has been biding its time underground for the last 17 years.

Brood X is part of a special group of cicadas called "periodical cicadas," known for their singular life cycles.

Depending on the brood, they emerge only once every 13 or 17 years.

As the sun warms their wings for the first time, these jewel-like insects zero in on a single goal: generating the next brood. They'll spend a few short weeks swarming nearby trees and finding mates. Then, after laying their eggs in the branches, they'll die—a swift and brutal conclusion to their exceptional lives.

Meanwhile, the eggs will hatch and the nymphs will fall to the ground, burrow into the soil and find nutritious tree roots to feed on. There, they'll begin their long wait in the dark.

There are only 15 periodical broods in the world, all of them found exclusively in the eastern United States. Brood IX, another 17-year swarm, emerged last year across North Carolina, Virginia and West Virginia. Brood VIII came out the year before.

These are some of nature's most well-timed events—humans have been documenting them for hundreds of years. But they could be shifting over time.

Sometimes, members of a brood come out before their time. It's happened throughout history—early emergences have been documented as far back as the late 19th century, according to Gene Kritsky, a cicada expert at Mount St. Joseph University in Ohio.

But there seem to have been a spree of these early events in recent years, he added.

In fact, a small segment of Brood X emerged early in 2017. Thousands of cicadas were sighted in the Washington area that year, a full four years before they should have come out.

Scientists are still working to better understand what triggers these events and why they sometimes get out of sync. Climate-related factors may play a role.

If that's the case, that means climate change has the potential to affect the timing of these events in the future, some experts say—potentially causing long-term changes in the 15 broods down the line.

"This is happening all the time now," Kritsky told E&E News.

Kritsky has been documenting and mapping periodical cicadas for decades. He's seen early emergings happen in multiple broods from Pennsylvania to Georgia over

the years, and he believes climate-related factors are largely to blame.

"These accelerations that we're seeing constantly for all these different broods over much of the eastern half of the U.S., the only common phenomenon that can account for it is climate," he said.

COUNTING THE YEARS

Periodical cicadas are something of a scientific enigma, even today. Scientists still aren't totally sure why they evolved their long life cycles in the first place.

Some experts believe the adaptation arose as a way to avoid predators, said John Cooley, a cicada expert at the University of Connecticut. Others believe it happened in response to glacial cycles, a way to cope with ice ages.

Tens of thousands of years later, periodical cicadas are still emerging like clockwork every 13 or 17 years. Scientists believe certain cues in the roots of the trees they feed on help them "count" the years go by.

"These plants lose their leaves in the fall and grow new ones in the spring," Cooley said. "So there must be a host of different signals going on and indications in the plants of what's going on."

Multiples of four seem especially important in the counting process, although scientists aren't sure why. When cicadas emerge early, it's most often by four years. That's what happened to Brood X back in 2017.

In these cases, scientists believe something must be happening to throw off the count.

So far, there isn't any definitive proof of what's going on. But climate factors may have something to do with it, Kritsky said.

False springs sometimes happen toward the end of mild winters, he pointed out. That's when the weather warms up just enough for trees to start leafing early. These events are often followed by at least one more freeze before spring sets in for good.

When that happens, Kritsky hypothesizes, it could trick the buried cicadas into thinking that more than one year has passed.

If he's right, then these early emergings could happen more frequently in the future. Numerous studies

suggest spring is already coming earlier across much of the United States as the climate warms.

But it's a difficult question to investigate. Periodical cicadas are challenging to study, precisely because they have such long life cycles. It could take decades to figure out whether there are any long-term changes happening in their behavior.

Still, it's worth monitoring.

For one thing, periodical cicadas draw strength in numbers. Individually, they're easy targets for birds and other insect-eating animals; they're large, flashy and easy to spot. Swarming out by the billions gives them an advantage against predators—it increases the odds that enough of them will survive to carry on the next generation.

Early emergings can potentially divide cicada populations and make them more vulnerable. The early ones often come out in relatively small groups, according to Kritsky—and they're often quickly gobbled up by predators.

When the rest of the population comes out on time, it's slightly smaller than it should be.

With Brood X, for example, "for everyone that came out in 2017, that was one fewer cicada that's gonna come out this year," Kritsky said.

That said, it doesn't look like the recent early events have caused any major trouble for the broods so far, Kritsky added. But it's worth keeping an eye on.

There's also the possibility that bigger splits could cause entirely new broods to arise. If part of a brood emerges early in large enough numbers to reproduce, the next generation might be permanently out of sync with the original brood—a new population entirely.

For now, these are mostly just hypotheses about the future. But scientists are getting better at monitoring cicada activity, which may help them better understand how these animals are responding to a changing environment.

Kritsky and colleagues at Mount St. Joseph University have developed an app called Cicada Safari, where anyone—scientists and non-scientists alike—can document their cicada sightings. The data can help researchers keep tabs on where different broods are

located, when they're emerging and whether any of these things are changing over time.

While plenty of questions remain, Cooley says it's important to soak up the magic of this year's event.

"There aren't really any other places in the world that you can go and see something like that," Cooley said. "So sit back and enjoy it, because it's unique." ●

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THE PANDEMIC OFFERED A UNIQUE CHANCE FOR MANY PEOPLE TO COME OUT AS QUEER

"I don't want to die having kept this part of myself locked away."

By Anna Lovine

Alyssa McGill came of age in the mid-1990s, when former President Clinton established homophobic doctrines like Don't Ask, Don't Tell and the Defense of Marriage Act. Both of those have since been abolished and acceptance of LGBTQ people has increased in the United States and throughout the world.

Still, the revelation that she's a lesbian proved challenging.

"I grappled with emotions, like wondering why I didn't realize it more fully sooner," said McGill, who questioned her sexuality for years prior, "and if that made me less gay."

She was married to a man for ten years before divorcing in 2018. During the pandemic, she finally came to the conclusion that she's a lesbian, and is now in a relationship with a woman.

McGill isn't alone in this newfound identity shift. There's no evidenced-based research as of yet, but throughout the pandemic, a lot of people like McGill have been coming out as a different gender identity or sexuality — to themselves or others.

Several pandemic conditions may have nudged these people along this path of self-discovery. That's not to say they wouldn't have come out if the pandemic didn't happen. As time passes people may grow and have a truer understanding of themselves. Ultimately, however, it's a moot point: We'll never know what would've occurred if coronavirus didn't exist.

In terms of gender identity, the number of people coming out as trans or nonbinary in the United States has skyrocketed over the past decade said Dr. Cary Gabriel Costello, associate professor of sociology and the director of the LGBTQ+ Studies Program at the University of Wisconsin-Milwaukee.

"Part of the sense that more people were coming out as trans/nonbinary/GNC [gender nonconforming] in the past year could be explained by that larger trend, rather than the pandemic," he said.

Costello and other experts do believe, however, that the pandemic has engendered some sort of coming out trend. "I agree that it seems there has been a boost in the number of people coming out," he said, "and that this relates to the pandemic."

ISOLATION AND SELF-REFLECTION

The pandemic's impact on us and society has been layered, and we probably won't know the full extent of it for a long time. One COVID effect that has been abundantly clear since the start, though, is enforced and prolonged isolation.

Many of us no longer had to commute or go to offices. Happy hours and dinners and nights out stopped. For some that meant being shut in with spouses and children and family in a constant blur state, but for others that meant being completely alone for huge stretches of time.

Solitude gives room for self-reflection that some may hitherto never had. Our days were suddenly quiet, our routines slowed to a crawl. In silence "people discover things about themselves that they may have known all along, or were afraid to admit," said Silvia M. Dutchevici, psychotherapist and founder of the Critical Therapy Center.

In this way, according to Costello, the pandemic may have accelerated the timelines of people's self-realization. McGill believes this to be true in her case:

While she questioned her sexuality long before COVID, she said it "sped along" her actualization. "The pandemic gave me a lot of downtime to reflect on what I wanted in life and what was keeping me from getting there," McGill said.

In solitude, we don't see anyone — and no one sees us, either. We're forced to confront who we are when we're alone and thus who we are in public. Are we performing? Who are we performing for?

An anonymous woman in Los Angeles told me she's begun questioning her gender and sexuality after spending a ton of time alone for the first time. Prior to the pandemic, she had an active social life and was out almost every night. She also thought she was a heterosexual cis woman before the pandemic, but the time away from others had led her to wonder.

"Obviously I haven't [gone out] at all in the last year," she said, "and it's forced me to think about who I am when no one's watching."

Others who are re-examining their identity echoed this sentiment, such as Rhiannon, a 29-year-old from South Africa, who came to terms with her queerness during the pandemic.

"I had more time to sit with myself and wrestle with my identity, because I wasn't distracting myself with my work commute or socialising," said Rhiannon. "I had to fully submerge myself into this long-ignored part of my brain and actually have a conversation with myself about it, ask questions without judgment, and try to figure out what queerness looks like for me."

The pandemic quickened timelines for some, said Costello, but for others, "it probably put an end to years of denial by removing a tactic of self-distraction via social busyness."

Rhiannon related to this denial. Her mental health "crash," as she described it, happened after isolation and the fear of coronavirus forced her to confront feelings that she'd pretended hadn't been there for over a decade prior.

Renhua, another person I spoke to going through this experience, came out as trans during the pandemic. They related to this pre-pandemic denial as well. "I believe if I had my usual daily distractions I would have put this thinking off longer," they said.

Another anonymous person who's questioned their gender in the past year said that for a long time they've been uncomfortable with people using male pronouns for them. After going through a breakup in October, they had time for self-reflection thanks for the pandemic, and that motivated them to think about a lot of things. Reflection, beginning to casually date again, and speaking with people they know led to the conclusion that they're probably nonbinary. That could be chalked up to the breakup, anonymous commented, but "it's also the case that being single and alone during the pandemic is definitely a different feeling."

"I had to fully submerge myself into this long-ignored part of my brain"

It's more likely that these gender/sexuality thoughts have been somewhat latent than coming up for the first time, though that can also occur. Sarah Harte, LICSW and director at mental health treatment community The Dorm, told Mashable that most people typically have ideas about their gender/sexuality, even from early childhood.

"It's not as much necessarily 'realizing' it for the first time — although that probably has happened as well — but it's about being able to hear that quiet voice inside of them or spending more time just with themselves," said Harte. "Coming to the point of saying, 'I do want to live within my true self and my true identities instead of feeling pressure to feel closeted.'"

This was the case for Alison, a woman in New York City, whose attraction for women came to light during the pandemic. Her four-year relationship with a man ended ten days before her office told her to work from home and the city shut down last year.

"It's something that has been festering for years, so it's not a complete revelation," she said of her queerness, "but the extraordinary amount of time spent alone, without human interaction or contact, and especially after ending a close and happy hetero relationship has in some ways given me the space to realize it in a way I may have continued to ignore or suppress if it were not for the pandemic."

Further, without being able to rebound from her breakup, she was able to mentally explore her fantasies and what she actually desired. If the pandemic didn't happen, Alison said, she may not have realized the

extent of her bisexuality because, in her words, she "would have buried those desires."

THE POWER OF EXISTENTIAL CRISES

Before the pandemic, 27-year-old Kelsea thought she was bisexual. Throughout several months last year, however, she came to the conclusion that she's a lesbian.

"There would be nights that would keep me up saying that I don't want to die having kept this part of myself locked away," she said. "I was tired of trying to fit in a box."

For many, COVID has caused literal or figurative brushes with death. When people confront their own mortality, Costello explained, it prompts them to cease delaying important steps they have planned to take "some day."

"Longstanding cultural traditions of deathbed confessions get triggered under such circumstances, as is the advice to get our affairs in order," said Costello. This prompts coming out.

Existential crises force us to face who we are, who want to be, and how we want to show up in the world. Kelsea began the pandemic in a relationship with a man, and now she's with a woman.

HOW SOCIAL MEDIA IMPACTS IDENTITY

People have been exploring queer identities online since the internet was invented, said Costello. Over time, online spaces have become increasingly public. That's not to say private groups and forums don't exist anymore — they certainly do — but the trend has been towards social currency in the form of followers, which encourages public posting.

"One result of this has been greater awareness on the part of cis straight people that members of their social circles are exploring their sexual or gender identities," Costello said. "Instead of carrying those explorations out in physical spaces away from cis and/or straight people, many individuals now carrying them out by trying out shifted gender presentations on Instagram, or tweeting out queer cultural references."

Anonymous in LA, in her mid-30s, experienced this while scrolling through TikTok. "I started watching all these TikToks of all these really cute queer Gen Zers,"

she said. She named one specific TikTok she stumbled upon, by user Tayler @worms.forbrains, featuring herself flipping from masculine to feminine outfits.

"I really relate to this [TikTok]," anonymous said. "I relate to having days where I want to wear a silk dress and then having days where I just fully am dressed like a boy."

On Tayler's TikTok profile, they say any pronouns work for them. Anonymous continued, "When I looked at their profile and they said 'any pronouns,' I was like, 'Okay, I definitely don't feel like a they/them — but I also kind of like this 'any pronouns' thing."

More broadly, the internet has enabled access to information previously not widely available, and access to like-minded people. If you've never met someone queer in person, it's easy to do so online.

During the pandemic, most if not all of our social interactions are online. This could enable people to explore aspects of their lives they've hidden from others or themselves, said Mary Bernstein, professor of sociology at the University of Connecticut.

Being forced online allowed Rhiannon to interact with fellow queer people without the potential friction of physical spaces, such as not feeling queer enough. "Because of the pandemic, I got to connect with new people who fully owned their sexual and gender identities who showed me what it could be like to be brave and fully accepting of yourself," she said, "without the pressure of feeling like I wasn't gay or bisexual 'enough' to join local queer clubs or hang out in queer bars."

Perhaps Rhiannon discovered what social scientists have, according to Costello: That online interactions aren't distinct from "real life." They are just as real as face-to-face interactions, even if some elements differ.

Social media is unique from film and TV, too, because we — "regular" people — are the ones making the content. "It's people like you and me," said Dutchevici. "Then people are like, 'Oh, well if they can do this, maybe I can explore, too.'"

The internet can also bring solace to people who don't have an in-person support system, say if they live with homophobic or transphobic parents. The pandemic has been especially traumatic for these people, Costello noted. The amount of students in his LGBTQ+ Studies-

affiliated course (where the majority are in the community) reporting somewhat or very bad mental health since lockdown is an alarming 65 percent.

COMING OUT ISN'T JUST FOR TEENAGERS

An ageist misconception is that coming out is for the "young."

"The psychologists' narrative that people come out as LGBTQ+ some time in their teens as a natural part of adolescence ignores the social factors that keep people from doing that," said Costello. Those in homophobic/transphobic households, for example, may only come out after they leave said household.

Further, capitalism and patriarchy function in such a way to keep us busy, to not think beyond our routines. When we're hustling to survive, we don't question ourselves or society, Dutchevici noted. We don't think of how compulsory heterosexuality and the like may have gotten hold of us; we don't contemplate our deepest selves or desires.

This misconception was even present in those interviewed. Rhiannon said she's still struggling with questions like, is she allowed to call herself queer if she just realized at 28? The answer is a resounding yes — but among a culture that prizes early coming out and ignores all the reasons that may not happen, it's an understandable concern.

"I'm nearing 30 and have no actual experience with women, it's almost like the thought of going back to grad school at this point," joked Alison, "sounds great in theory but not sure the timing makes sense for me." Dating after the pandemic sounds scary enough, she said, without considering exploring dating women.

"I don't want to die having kept this part of myself locked away"

THE UNCERTAIN FUTURE

It's a weird time for all of us, let alone those undergoing these identity shifts. Flirting, dating, hooking up — it's through these activities that people explore and figure out who they are, Costello said, and those exploring right now can't experience them.

A common refrain is that this summer will be the "whoring 20s," an absolute free-for-all for fully vaccinated people, especially now that the CDC deemed it okay for those to mingle up close and mask-free.

Imagining life once herd immunity is reached is exciting, yes, but it's also anxiety-inducing. No one can say with any certainty what post-pandemic life will look like. Add a new element of your identity to the mix, and that anxiety may be compounded.

My Mashable colleague Alex Humphreys came out as trans and began hormone replacement therapy (HRT) shortly before quarantine began and described their journey as both great and terrible. "On one hand I really got to sit with my identity in this incubation period and really explore this kind of newfound gender euphoria," they said, evoking the term describing the joy trans people can experience when living as their true gender (seen as the opposite, in a sense, to gender dysmorphia).

"On the other hand, it's been a year since I've spent a good amount of time in public and I exist in those spaces very differently now," Humphreys said. Thinking about returning to "normal" life overwhelms them because they now have to consider things like bathrooms and doctors.

"I knew the world existed in a binary before I came out and made all these choices, but now I'm really going to have to live in it and that's scary," they said, "and exciting."

Anonymous in Los Angeles believes the future of her gender and sexuality journey can go in one of two directions.

"I could start dating a dude and be like, 'That was a weird time that I was confused when I was in quarantine,'" she said, "or this could be a very real moment of clarity, and I could end up being a different person after this."

Any fear McGill has, however, is outweighed by excitement and relief. "I'll never regret my previous relationships, in particular my marriage that garnered my children," she said, "but in some ways, I feel like an adolescent who is just starting to date. Everything is new and familiar at the same time." ●

A NEW STUDY HAS FOUND THAT HEARTBEATS ACTUALLY HARMONIZE DURING THIS RELIGIOUS RITUAL

By Steward Ain

Two anthropologists have discovered that the heartbeats of those who practice Sufism, a mystical dimension of the Islamic faith, beat in tandem during a communal ritual in which all of the congregants join in deep meditation or an ecstatic trance. Rabbis and cantors told the Forward they were not surprised.

"Anyone who has been at a really good worship service knows the power of kinetic worship services," said Rabbi Lawrence A. Hoffman, a professor at Hebrew Union College-Jewish Institute of Religion. "There have been prior reports of such things. For instance, kids who play in a playground will get into sync with one another. There are reports that if you videotaped them, you would see they eventually hopped or skipped in sync with one another. Human beings are aware of the possibility of being in sync."

In fact, according to Cantor Matthew Austerklein, "all musicians of any religion try to achieve a sense of oneness, and there is no greater oneness than singing with other people. And the nigun [melody] is a primary vehicle. ... I was part of a Mincha service at the Jewish Theological Seminary where everyone began with a nigun to set the mood for prayer. One of the things that singing a nigun teaches is that we can be sensitized to each other through music."

Asked about the study that found heartbeats of participants sync during meditation or an ecstatic trance, Austerklein, who serves as cantor of Beth El Congregation in Akron, Ohio, replied, "I'm not surprised at all by that. One of the things that nigun singing teaches is that we can be sensitized to each other through music. We feel closer to people around us and with God when we sing with other people."

A MAN PRAYING AROUND A FIRE.

The two researchers who conducted the study, Dimitris Xygalatas and Christopher Manoharan, are anthropologists at the University of Connecticut. They went to Istanbul, Turkey, and affixed heart monitors under the clothing of 20 congregants. They then watched as the worshippers performed the largest and most important Sufi ritual, the dhikr (remembrance), which is often referred to by Sufis as “the way to the heart.”

“Their hearts really did beat as one,” Manoharan said. “The heart is variable. It has a range of normal heartbeats and, within seconds, you can align it with another person. You can place your hand on a bulb when it lights at a particular time to a rhythm or a vibration or a sound. If you have a group of people all doing it, your heartbeats will line up in short order; it’s a form of biofeedback.”

BUT WHAT ABOUT PEOPLE PRAYING OVER ZOOM?

But congregants attending religious services over Zoom do not get into sync with other congregants who are also participating over Zoom, Austerklein pointed out.

“It’s just not the same,” he said.

Manoharan agreed, saying: “When you are shoulder-to-shoulder [with other congregants] there is a heartbeat and spiritual sensitivity – it gives you more of a connection with your neighbor. If you are uttering the same chant and feeling your body resonate, the resonance chambers inside your chest mesh with those of others.”

At Hebrew Union College-Jewish Institute of Religion, the students are taught that “it is important to develop a regular rhythm of the service to get them in sync,” Hoffman pointed out.

Thus, if in the middle of a prayer service “someone gets up and makes an announcement or introduces all of the prayers with an explanation of each one, you have learned a lot when the service has finished but you do not feel the satisfaction of having prayed,” he said.

Hoffman said he has learned that at conferences that bring together people from many different synagogues it is best to begin a service with music, otherwise “the

person leading will have trouble getting everyone into sync. If they start with 10 minutes of singing, everything will then go smoothly. Similarly, camps have song leaders because once they get kids from all over to sing together, they have a community. I would not be surprised if all of their hearts then beat together.” ●

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BILLIONS (YES, BILLIONS) OF CICADAS SOON TO EMERGE FROM UNDERGROUND

Swarms of cicadas, part of a group called Brood X, are expected to appear in 18 states in the next few weeks, just in time to help orchestrate the soundtrack of summer.

By Jesus Jimenez

A few months of quarantine during the coronavirus pandemic? That’s nothing for a swarm of cicadas that have been underground since 2004.

In the time that the United States has seen the Boston Red Sox break an 86-year World Series drought, five presidential elections, a deadly pandemic and an insurrection, these creatures have been minding their own business, burrowed in the soil.

Now billions of cicadas, from a group known as Brood X, are expected to emerge in the next few weeks, just in time to help orchestrate the soundtrack of summer.

WHAT IS BROOD X?

Brood X is one of several groups of periodical cicadas that emerge from beneath the ground every 17 years. Other cicadas have 13-year life cycles.

“It’s really strange that a group of insects spends 17 years underground, and then they decide to come up,” said Matt Kasson, an associate professor of forest pathology and mycology at West Virginia University.

Cicadas, which feed from the sap of trees and plants, count freeze-and-thaw cycles as an “internal tally system” that tells them when it’s time to surface, Dr. Kasson said. Brood X is one of the largest groups, and this year’s emergence could mean tens of billions of cicadas, he said.

WHEN WILL THE CICADAS EMERGE?

The timing of the appearance of Brood X cicadas varies by location. They are ready but waiting for the soil to be warm enough. The ideal soil temperature for cicadas is about 64 degrees, Dr. Kasson said.

For the Mid-Atlantic region, that usually comes by about the third week of May, but it could be sooner. “Usually, you have stragglers on either side,” he said.

WHAT STATES CAN EXPECT TO SEE BROOD X?

Brood X is expected to emerge in about 18 states, Dr. Kasson said. In the past, Brood X cicadas have been spotted as far north as Michigan, as far south as Georgia, and as far west as Illinois. Other states where they might emerge include Kentucky, Ohio, New Jersey, New York, Pennsylvania and Tennessee.

Brood X, which is also known as the Great Eastern Brood, has three epicenters across portions of the country. One will be in the Washington, D.C., area, including Northern Virginia and parts of Maryland. Another will be rooted in Indiana, and there will be a smaller one in and around Knoxville, Tenn., Dr. Kasson said.

Not all states will see large emergences of cicadas, said Chris Simon, a professor of ecology and evolutionary biology at the University of Connecticut. “Some of them, it’s just a tiny little corner,” she said. Other states, like Texas, get cicadas every summer, but those are typically annual cicadas or another type, Dr. Simon said.

ARE CICADAS DANGEROUS?

Because they feed off plants, cicadas can injure small trees and shrubs but cause no harm to humans, Dr. Kasson said.

“They’re just really big and awkward,” he said.

If anything, he said, Americans should consider themselves lucky to witness the phenomenon. “It’s really something to marvel at,” he said.

They can, however, be annoying because of the sharp buzz they make when they’re looking for mates.

“Males go on a singing spree,” Dr. Kasson said, adding that in some areas with many cicadas, the sound can be deafening. “It results in this cacophonous shrill.”

Some cicadas are louder than others, Dr. Simon said, and some sing in different tones, from a mellow whistle to a raspy chorus.

LEARN MORE ABOUT CICADAS

Here comes Brood X. Species of periodical cicadas will emerge in places all over the eastern part of the United States in the coming weeks. Here’s what you should know about our insect visitors making their once-in-every-17-year appearance.

Answers to common questions: Where will the cicadas be? When will you see them? And what the heck are they doing?

Where they have disappeared: On Long Island in New York and in other locations, Brood X may have vanished forever.

Test yourself: Seventeen years is a lot to catch up on for Brood X. Test your memory of what was happening in our world when they last appeared in 2004.

Listen to their music: Cicadas are loud and noisy. But if you know how to listen, you’ll hear the music they make, a contributor writes in this guest essay.

Sounds up to 90 decibels could be measured standing directly under a tree filled with cicadas. A motorcycle, by comparison, can put out sounds up to 95 decibels, which can damage hearing after about 50 minutes of continuous exposure, according to the federal Centers for Disease Control and Prevention. “It can be so loud that you want to put your fingers in your ears,” Dr. Simon said of the cicadas.

HOW LONG WILL BROOD X BE AROUND?

Brood X won’t be buzzing for long. Once they emerge, the cicadas will be out for about four to six weeks, Dr. Kasson said. After the cicadas have mated and the eggs

hatch, the nymphs, as cicadas are called before they are fully grown, will emerge, Dr. Kasson said.

The nymphs then begin their 17-year cycle, feeding underground. After this year, those nymphs will emerge as cicadas in the next Brood X, the class of 2038.

WHAT SHOULD YOU DO IF YOU SEE A CICADA?

Anyone who is interested in more than just listening to the cicadas' soundtrack can help researchers by reporting sightings online at iNaturalist.org or Cicada Mania, or by using the app Cicada Safari.

CAN YOU EAT THEM?

For those interested in trying new foods, cicadas are edible, said Dr. Kasson, who compared the taste to tofu. "It takes on what you cook it in," he said. ●

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SHOULD WE BLOCK THE SUN? SCIENTISTS SAY THE TIME HAS COME TO STUDY IT.

The National Academies said the United States must study technologies that would artificially cool the planet by reflecting away some sunlight, citing the lack of progress fighting global warming.

By Christopher Flavelle

The idea of artificially cooling the planet to blunt climate change — in effect, blocking sunlight before it can warm the atmosphere — got a boost on Thursday when an influential scientific body urged the United States government to spend at least \$100 million to research the technology.

That technology, often called solar geoengineering, entails reflecting more of the sun's energy back into space through techniques that include injecting aerosols

into the atmosphere. In a new report, the National Academies of Sciences, Engineering, and Medicine said that governments urgently need to know whether solar geoengineering could work and what the side effects might be.

"Solar geoengineering is not a substitute for decarbonizing," said Chris Field, director of the Woods Institute for the Environment at Stanford University and head of the committee that produced the report, referring to the need to emit less carbon dioxide and other greenhouse gases into the atmosphere. Still, he said, technology to reflect sunlight "deserves substantial funding, and it should be researched as rapidly and effectively as possible."

The report acknowledged the risks that have made geoengineering one of the most contentious issues in climate policy. Those risks include upsetting regional weather patterns in potentially devastating ways, for example by changing the behavior of the monsoon in South Asia; relaxing public pressure to reduce greenhouse gas emissions; and even creating an "unacceptable risk of catastrophically rapid warming" if governments started reflecting sunlight for a period of time, and then later stopped.

But the authors argue that greenhouse gas emissions are not falling quickly enough to avoid dangerous levels of global warming, which means the world must begin to examine other options. Evidence for or against solar geoengineering, they found, "could have profound value" in guiding decisions about whether to deploy it.

That includes evidence about what the authors called the social risks: For example, if research showed that the side effects would be concentrated in poorer nations, Dr. Field said, it could be grounds not to pursue the technology, even if it benefited the world as a whole.

The report also argued that by publicly funding geoengineering research, the United States could ensure that the work is transparent and accountable to the public, with clear rules about when and how to test the technology.

Some critics said those safeguards weren't enough.

The steps urged in the report to protect the interests of poorer countries — for example, accounting for farmers in South Asia whose lives could be upended by changes

in rain patterns — could fall away once the research begins, according to Prakash Kashwan, a professor of political science at the University of Connecticut.

“Once these kinds of projects get into the political process, the scientists who are adding all of these qualifiers, and all of these cautionary notes, aren’t in control,” Dr. Kashwan said.

Jennie Stephens, director of the School of Public Policy and Urban Affairs at Northeastern University, said that geoengineering research takes money and attention from the core problem, which is cutting emissions and helping vulnerable communities cope with the climate disruptions that are already happening.

“We need to double down on bigger transformative changes,” Dr. Stephens said. “That’s where the investment needs to be.”

Solar geoengineering has bipartisan support in Congress, which in late 2019 gave the National Oceanic and Atmospheric Administration \$4 million to research the technology.

“America needs to be on the cutting edge of climate research,” Representative John Curtis, Republican of Utah, said in a statement. “More knowledge is always better.”

The calculation could be more difficult for President Biden, who has tried to gain the support of the party’s progressive wing, some of whom are skeptical about geoengineering. Senator Bernie Sanders of Vermont has called it a “false solution,” grouping it with nuclear power or capturing carbon dioxide and burying it underground.

Asked for comment on the report, a White House spokesman, Vedant Patel, said by email that President Biden “has been clear about addressing the climate crisis.” He added, “innovative solutions that can help accomplish this should be looked into and studied.”

Tylar Greene, a spokeswoman for NASA, which helped fund the report, said in a statement that “we look forward to reviewing the report, examining recommendations, and exploring how NASA and its research community can support this effort.”

Ko Barrett, deputy assistant administrator at NOAA, which also helped fund the report, said in a statement that the agency looked forward to “carefully reviewing”

it. The Department of Energy, another funder, didn’t respond to a request for comment.

The endorsement by the National Academies might make some lawmakers feel more comfortable supporting the technology, according to Michael Gerrard, director of the Sabin Center for Climate Change Law at the Columbia Law School and editor of a book on solar geoengineering.

And rather than causing people to care less about curbing greenhouse gas emissions, he said, a large new federal research program into geoengineering might have the opposite effect: Jolting the public into taking climate change seriously by demonstrating that more extreme and dangerous options may soon be necessary.

“It could be so scary that people will be even more motivated to reduce emissions,” Mr. Gerrard said. ●

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ANCIENT COINS MAY SOLVE MYSTERY OF MURDEROUS 1600S PIRATE

By William J. Kole

A handful of coins unearthed from a pick-your-own-fruit orchard in rural Rhode Island and other random corners of New England may help solve one of the planet’s oldest cold cases.

The villain in this tale: a murderous English pirate who became the world’s most-wanted criminal after plundering a ship carrying Muslim pilgrims home to India from Mecca, then eluded capture by posing as a slave trader.

“It’s a new history of a nearly perfect crime,” said Jim Bailey, an amateur historian and metal detectorist who found the first intact 17th-century Arabian coin in a meadow in Middletown.

That ancient pocket change — among the oldest ever found in North America — could explain how pirate Capt. Henry Every vanished into the wind.

On Sept. 7, 1695, the pirate ship *Fancy*, commanded by Every, ambushed and captured the *Ganj-i-Sawai*, a royal vessel owned by Indian emperor Aurangzeb, then one of the world's most powerful men. Aboard were not only the worshipers returning from their pilgrimage, but tens of millions of dollars' worth of gold and silver.

What followed was one of the most lucrative and heinous robberies of all time.

Historical accounts say his band tortured and killed the men aboard the Indian ship and raped the women before escaping to the Bahamas, a haven for pirates. But word quickly spread of their crimes, and English King William III — under enormous pressure from a scandalized India and the East India Company trading giant — put a large bounty on their heads.

"If you Google 'first worldwide manhunt,' it comes up as Every," Bailey said. "Everybody was looking for these guys."

Until now, historians only knew that Every eventually sailed to Ireland in 1696, where the trail went cold. But Bailey says the coins he and others have found are evidence the notorious pirate first made his way to the American colonies, where he and his crew used the plunder for day-to-day expenses while on the run.

The first complete coin surfaced in 2014 at Sweet Berry Farm in Middletown, a spot that had piqued Bailey's curiosity two years earlier after he found old colonial coins, an 18th-century shoe buckle and some musket balls.

Waving a metal detector over the soil, he got a signal, dug down and hit literal paydirt: a darkened, dime-sized silver coin he initially assumed was either Spanish or money minted by the Massachusetts Bay Colony.

Peering closer, the Arabic text on the coin got his pulse racing. "I thought, 'Oh my God,'" he said.

Research confirmed the exotic coin was minted in 1693 in Yemen. That immediately raised questions, Bailey said, since there's no evidence that American colonists struggling to eke out a living in the New World traveled to anywhere in the Middle East to trade until decades later.

Since then, other detectorists have unearthed 15 additional Arabian coins from the same era — 10 in Massachusetts, three in Rhode Island and two in Connecticut. Another was found in North Carolina, where records show some of Every's men first came ashore.

"It seems like some of his crew were able to settle in New England and integrate," said Sarah Sportman, state archaeologist for Connecticut, where one of the coins was found in 2018 at the ongoing excavation of a 17th-century farm site.

"It was almost like a money laundering scheme," she said.

Although it sounds unthinkable now, Every was able to hide in plain sight by posing as a slave trader — an emerging profession in 1690s New England. On his way to the Bahamas, he even stopped at the French island of Reunion to get some Black captives so he'd look the part, Bailey said.

Obscure records show a ship called the *Sea Flower*, used by the pirates after they ditched the *Fancy*, sailed along the Eastern seaboard. It arrived with nearly four dozen slaves in 1696 in Newport, Rhode Island, which became a major hub of the North American slave trade in the 18th century.

"There's extensive primary source documentation to show the American colonies were bases of operation for pirates," said Bailey, 53, who holds a degree in anthropology from the University of Rhode Island and worked as an archaeological assistant on explorations of the *Wydah Gally* pirate ship wreck off Cape Cod in the late 1980s.

Bailey, whose day job is analyzing security at the state's prison complex, has published his findings in a research journal of the American Numismatic Society, an organization devoted to the study of coins and medals.

Archaeologists and historians familiar with but not involved in Bailey's work say they're intrigued, and believe it's shedding new light on one of the world's most enduring criminal mysteries.

"Jim's research is impeccable," said Kevin McBride, a professor of archaeology at the University of Connecticut. "It's cool stuff. It's really a pretty interesting story."

Mark Hanna, an associate professor of history at the University of California-San Diego and an expert in piracy in early America, said that when he first saw photos of Bailey's coin, "I lost my mind."

"Finding those coins, for me, was a huge thing," said Hanna, author of the 2015 book, "Pirate Nests and the Rise of the British Empire." "The story of Capt. Every is one of global significance. This material object — this little thing — can help me explain that."

Every's exploits have inspired a 2020 book by Steven Johnson, "Enemy of All Mankind;" PlayStation's popular "Uncharted" series of video games; and a Sony Pictures movie version of "Uncharted" starring Tom Holland, Mark Wahlberg and Antonio Banderas that's slated for release early in 2022.

Bailey, who keeps his most valuable finds not at his home but in a safe deposit box, says he'll keep digging.

"For me, it's always been about the thrill of the hunt, not about the money," he said. "The only thing better than finding these objects is the long-lost stories behind them." ●

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THE CICADAS ARE COMING

Brood X, perhaps the largest in the country, will emerge this spring after 17 subterranean years. Here's why it takes so long for them to emerge and how they will spend their fleeting time above ground.

By Cody Cottier

For nearly two decades, billions of cicadas have lain beneath the ground of eastern North America, feeding and fattening, waiting for the signal to rise and restart one of the most extraordinary life cycles in the animal kingdom. They are Brood X, an insect swarm of mind-boggling proportions that will soon make its first appearance since 2004.

The bugs belong to a group called "periodical cicadas," named as such because they emerge only once every 13 or 17 years, depending on the brood. A brood, by the way, is simply a class of cicadas that happen to pop out of the ground at the same time — there are 15 in the U.S. They often consist of multiple species, all coincidentally synchronized. Brood X, or the Great Eastern Brood, spans more than a dozen states, and may be the largest among the 17-year cicadas.

From Illinois to Pennsylvania and down into Georgia, they will erupt from their burrows, a million and a half to each acre, creeping across the ground like an arthropodal lava flow. Only nymphs at this stage, they must shed their exoskeletons and sprout wings before they can fulfill the sole goal of their bizarre 17-year existence: to produce the next brood.

During that six-week process — which could begin as soon as late April in some places, whenever the soil reaches about 64 degrees Fahrenheit — they'll make quite a racket. The summer buzz of male cicadas attracting mates is an annual phenomenon, but years with large broods are louder than others. This one ought to be deafening.

Then, as soon as the females lay their eggs inside tree branches, the hum will fade. The adults will die, their carcasses littering the woodlands, and the hatchlings will fall from the trees to establish new burrows. The cycle repeats. Like clockwork, they will lie dormant until they fill the skies and the eardrums of the eastern U.S. again in 2038.

MAGIC IN THE AIR

The periodical cicadas — three 17-year and four 13-year species — in many ways baffle researchers. Amid some 3,000 species worldwide, these seven are more or less an island (though a couple isolated broods live in Fiji and Australia). Genetic testing confirms their singularity — they have no close relatives, says John Cooley, an entomologist at the University of Connecticut.

Their genus is *Magicicada*, which, entomological rumor has it, was named for the magic of its constituents. They spend 150,000 hours underground doing Darwin knows what, materialize seemingly out of thin air, and after six weeks of sound and fury disappear for another half of a human generation. No wonder if William T. Davis — the foremost cicada expert of his time — felt charmed

when he classified them in 1925. “He wasn’t under the illusion that it was magic,” Cooley says, “but it has that magical quality to it.”

It’s all the more enchanting because scientists can’t yet account for their periodicity. There are several theories, “and they’re all dissatisfying for one reason or another,” Cooley says. One suggests that the wide intervals help cicadas thwart the biological principle of numerical response — predators become more abundant as do their prey. But if the prey appear only so often, predators must synchronize their own life cycles to take advantage of the infrequent bounty. That alone forms enough of an evolutionary hurdle to shake off some predators.

But it hasn’t escaped the notice of mathematicians that both 13 and 17 are prime numbers. Coincidence? Some think not. A cycle that is divisible by only itself and 1 won’t often overlap with predator populations that boom, say, every two or three years. That said, one fungus has evolved to target periodical cicadas, and cycles of 7, 11 or 19 years would presumably work as well.

Another theory ties their periodicity to glacial eras in the distant past. Maybe a longer interval maximized their chances of meeting with the warm conditions they require. But thousands of other species endured the ebb and flow of glaciers on an annual basis. For now, there is no clear explanation of their unique evolutionary path, Cooley says. “It must have been an interesting story,” he adds. “Too bad they can’t tell it.”

FLUCTUATING BROODS

For raccoons, robins, turtles and bats, a cicada emergence of this scale is a once-in-a-lifetime buffet. They gorge until they can gorge no more, and then, full to bursting, leave the survivors in peace as they digest. The defenseless cicadas, unable to bite or sting, must resort to this brute-force strategy, known as predator satiation: They present themselves in such overwhelming numbers that even after they’ve filled every stomach around, the population is still robust enough to ensure a new generation.

That’s the idea, anyway, but it can and does fail. Small pockets of cicadas occasionally emerge early or late — always by one or four years, curiously — and without

sufficient ranks they’re no match for the fauna higher up the food chain.

No one is sure what causes these false starts. Cicadas track the seasonal cycles of the roots they feed on, using a mechanism that is more a counter than a continuous, time-keeping clock — once Brood X carves the 17th notch in its stick, so to speak, it knows the time has come. But the bugs sometimes miscount and fall out of sync. Some of these “stragglers,” as they’re called, will be decimated easily by predators. Others may form self-sustaining groups.

Cicada populations are not static, and cataloging their shuffling is a fuzzy business. “Nobody has caught a new brood in the act,” Cooley says, though there are a few candidates. In 1969, a sizable portion of a 17-year brood near Chicago came out four years early, and has been early ever since. Is it now an independent 13-year brood, or a perennially confused segment of the original one? And if cicadas’ internal counters rely on climatic signals, will broods increasingly fracture in the coming decades of climate change?

Many unanswered questions may benefit from improved data. “Really the only hope of sorting it out is to get very detailed information about the density of cicadas that are out in any given year,” Cooley says. To that end, entomologist Gene Kritsky of Mount St. Joseph University developed a citizen-science app called Cicada Safari, through which the public can record observations.

When not helping to document the emergence of Brood X, the residents of cicada country should “sit back and enjoy,” Cooley advises, and reflect on a simple but remarkable fact about these magical insects: “They are not coming from anywhere. They’re always here — they’re just in the ground.” ●

SCIENTISTS NEED TO BECOME BETTER COMMUNICATORS, BUT IT'S HARD TO MEASURE WHETHER TRAINING WORKS

By Fiona Vernal, Margaret Rubega, and Robert Capers

Science is essential to solving many of society's biggest problems, but it doesn't always find a receptive audience. Today, when curbing COVID-19 requires hundreds of millions of Americans to get vaccinated, it's more urgent than ever for scientists to be able to communicate effectively with the public.

The challenge was clear long before the pandemic. Scientists began to realize they needed to do better at explaining their findings in the 1990s, after fossil fuel corporations and conservative politicians rejected evidence that the globe was warming at an alarming rate. In response, a range of programs sprang up that were designed to teach everyone, from veteran scientists to young graduate students, how to better communicate their often arcane and confusing research.

Today there's an expanding number of science communication training programs that last anywhere from a few hours to several months. Techniques range from storytelling and improvisation to coaching through simulated interviews with journalists and public relations specialists. Yet voices opposed to mainstream scientific views remain a powerful force in the U.S.

We have taught science communication courses for more than a decade at the University of Connecticut. Margaret Rubega talks regularly to the press as the Connecticut state ornithologist and has won a universitywide teaching award. Robert Capers is a Pulitzer Prize-winning former journalist and botanist. Robert Wyss is a journalist who reported on environmental issues for decades and authored a book on environmental journalism.

All of us wanted to know more about what really helps scientists talk to the public. What we found in a recent study funded by the National Science Foundation surprised us, and convinced us that it's time to rethink how we assess whether science communication training works.

PRACTICE MAKES ... NOT MUCH DIFFERENCE

Our investigation began by recruiting graduate STEM students to semesterlong science communication courses that featured lectures, discussion, exercises and mock journalism interviews. Every student participated in repeated interviews that we video-recorded and then reviewed in class. We wanted to see how well they could talk clearly and engagingly about their work on topics in science, technology, engineering and medicine.

At the end of the semester our written surveys drew strong praise from the students. "The interviews forced us to put ourselves out there," said one student, "to make mistakes, analyze them and then reflect on how to improve in the future."

Such comments were not surprising. Most science communication training programs query participants and get positive responses. But more probing research has shown that students consistently overestimate how well they perform.

Our research was designed to go further. Over three years we video-recorded students explaining a scientific concept at the beginning of the course and then again at the end. Then we showed these videos, along with videos made by a control group of students who did not receive science communication training, to hundreds of undergraduate students.

We asked the undergraduates to rate the students they saw in the videos on various communication skills. The results showed that students who had taken the training courses did no better communicating with the undergrads than did the students who had had no training.

Furthermore, the trained students received only slightly higher scores after taking the course than they did at the beginning. And the untrained students in our control group showed an equal – minimal – improvement in scores.

In sum, students who took our communication training class received lots of instruction, active practice and direct analysis of what to do differently. However, the undergraduates who did the ratings did not appear to perceive any difference between students who took the training course and others who did not.

LOOKING FOR A JUMP-START

We were surprised by these findings. Were we the worst science communication teachers working?

Perhaps, but that would be surprising too, given the varied experiences we brought to this effort. An educational consultant oversaw our curriculum, and our research team included communications specialist Anne Oeldorf-Hirsch; postdoctoral researcher Kevin Burgio; and statistician A. Andrew MacDonald at Montreal University.

Our biggest question was what we could conclude from this study about the range of training approaches in science communication. If a 15-week, three-credit course doesn't change communication behavior much, how much can scientists expect to gain from shorter trainings, such as the kind of singular sessions frequently offered at conferences?

We don't believe our results show that science communication training is worthless. Students unquestionably leave our courses much more aware of the pitfalls of using jargon, speaking in complex sentences and talking more about the caveats than about the bottom line. It just appears that knowledge doesn't translate to enough of a change in their use of jargon, complex sentences and ability to get to the point to change how audiences score them.

We suspect that what students need is much, much more active practice than even a full-semester course gives them. As science writer Malcolm Gladwell has famously pointed out, it can require 10,000 hours of practice to become skilled at complex tasks.

The big challenge in assessing different kinds of science communication training is tracking how skills improve over the long term. Perhaps more importantly, we'd like to know whether there's any way to help scientists improve more quickly.

The National Science Foundation currently requires every scientist who receives a federal grant to explain

how that research will affect the public, including plans for communicating the results. Perhaps the NSF and other funders of science communication training should require rigorous assessments of the training they are paying for.

At the very least, we hope our research generates discussion among scientists, journalists and those interested in public science literacy. Two European scholars recently issued a similar call for more rigorous research on what actually works in science communication, and for a serious dialog about how to use that evidence to improve the practice of communication.

Clearly, organizations that train scientists have to do more than just ask participants in a class whether they learned anything. Our study showed that there's a need for rigorous methods to assess communication training programs. Without them, trainers can't tell whether they are just wasting their time. ●

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THE OTHER SIDE OF SOCIAL AND EMOTIONAL LEARNING: CULTURE, IDENTITY, AND COMMUNITY CONCEPTS OF TEACHING AND LEARNING IN K-12 EDUCATION

Old Wine, New Bottles? Thirty Years of Social and Emotional Learning

By **Fiona Vernal**

Every few decades, education experts reconsider what pedagogies, principles, materials, and methods will contribute to success in the classroom. Social and emotional learning (SEL), a framework developed

almost thirty years ago in 1994, is beginning to coalesce and gain momentum throughout the country. By August 2020, 29 states had developed SEL standards for teachers and students, with the pandemic accelerating urgent calls for more attention to learners' emotional health and well-being. State and school districts' SEL programs are being ranked or highlighted in a number of industry forums, think-tanks, non-profits, and in spaces like blogs and government websites. Education programs have begun offering certification.

SEL involves children and adults' ability to develop self-regulatory skills that aid in the process of managing emotions, making effective decisions, expressing and feeling empathy, and developing healthy relationships to become successful in all stages of life. Specific to students in K-12 academic settings, the range of self-regulation can include learners' ability to stay on task, regulate reactions to events, and learn socially acceptable behaviors for school, home, and community. In later stages of life, SEL is being attached to college and career readiness as well as civic and community engagement. The stakes could not be higher.

Initiatives like SEL, when made a part of public education policy, unleash a cascade of new guidelines, procedures, and professional development opportunities that can seem like old wine in new bottles. Educators are, after all, familiar with "whole child," "lifelong learning," and other educational approaches that emphasize that learners are not a blank slate and, along with families and educators, and communities, are part of one ecosystem.

SEL, as an educational panacea, must come to terms with the widespread calls for social justice, equity, and cultural competency in the classroom.

Young people across the nation are demanding to see their life experiences, cultures, communities, and identities reflected in their curriculum. Systemic racism, also in the spotlight, makes it all the more important for educators to address with purpose and precision, the links between SEL, learning, culture, community, and identity.

CULTURE GETS A PERMANENT SEAT IN THE CLASSROOM

Teachers understand explicitly that their preparation and training are important variables in learner success.

So is the curriculum. School administrators must be intentional in selecting a curriculum that includes a clear focus on the integration of compelling and challenging perspectives. Curricular shifts have brought a more sustained focus on customs, practices, and historical experiences from a variety of nations and people of varied racial and ethnic identities. Anemic or intermittent efforts focused on food, music, fiestas, and cultural heritage month have given way to more robust efforts, including a groundswell of reforms in history and social studies. Professional development is the key to ensuring that a new curriculum that includes bold, anti-racist, and culturally relevant narratives is now integrated in an effective manner.

Why is this important? Because the vast majority of public school teachers are White. The National Center for Education Statistics reports that:

In 2017–18, about 79 percent of public school teachers were White, 9 percent were Hispanic, 7 percent were Black, 2 percent were Asian, 2 percent were of Two or more races, and 1 percent were American Indian/Alaska Native; additionally, those who were Pacific Islander made up less than 1 percent of public school teachers.

If the curriculum is getting reformed, the textbooks are being rewritten, and SEL is being integrated into educational strategies, then professional development must also leverage the SEL model of lifelong learning to help teachers make sense of community and identity as curricular assets. This is an opportunity for teachers to demonstrate that they too are lifelong learners willing to respond to continuous feedback and willing to see culture as content and culture as a skillset.

Asset-based frameworks that integrate culture, identity and community into SEL frameworks transform classrooms into spaces of shared authority, agency, and collaborative learning. Community and identity as curricular assets can remain murky when viewed from the vantage point of daily and weekly learning activities. How can teachers leverage student, family, and community knowledge?

INCORPORATING STUDENT INPUT INTO LESSON PLANS

Teachers can solicit each student's own account of what culture means to them and develop lesson plans that can integrate content-area knowledge, particular skill

sets, and SEL frameworks. This should include helping students to explore their own cultural identities. This example is drawn from a high school social studies immigration module with potential ELA integration.

Students will:

- Develop individual reports of how they view their culture and the theme of immigration
- Report and compare with someone in their group/pair-share
- Identify which stories connected with them emotionally and why
- Engage texts that address internal migration and migration to the US of different groups
- Research web resources and databases for census and immigration data
- Develop a short 10-minute interview with two family members from different generations or a community member to encourage classroom-family connections/classroom-community connections
- Collage their family and community interviews and highlight themes
- Explore public oral histories via the Library of Congress and select one family or community member to conduct a longer interview
- Storyboard their ideas and collect photographs and pictures of artifacts
- Create a poster session exhibit and invite parents and the community to the school-wide premiere
- Write/Share a reflection on their experience

Teachers will:

- Collage reports and organize students into rotating groups or pair-shares to talk about patterns
- Provide texts that address internal migration and migration to the US of different groups
- Unpack the terms immigration, emigration, migration and use the term mobility to talk about different ways people move within and between countries
- Connect students with web resources/databases where they can search census and immigration data
- Introduce interview methods and have students practice with each other

- Discuss the merits, methods, and challenges of oral histories including memory, privacy, and confidentiality
- Consider expanding the lesson to invite community members from students' interviews and integrating public oral history, along with sharing with ELA teachers, and planning a schoolwide or grade level assembly

In all stages of implementing this lesson, SEL was front and center — explicit and implicit. Students played a role in leading the organization of information and materials and developing a community and family component of their academic work. They participated in activities that required time management, socializing, communication, collaboration, adaptable thinking, strategizing, decision making, listening, and creativity. They assimilated information in a way that was culturally meaningful and relevant and could incorporate their own and others' families and community. They were introduced to oral histories and databases and developed tangible deliverables that had a wider audience. They explored broad conceptual frameworks for understanding why people move and connected their own and their families' experiences to global, national, regional, and local histories of migration, including internal migrations.

RETHINKING/REIMAGINING SEL

Old wine in new bottles may require that we dust off or finally implement the almost 30-year old framework of SEL that attempted to address the efficacy of educational interventions and theories of learning. Long before SEL, Paulo Freire's 1968 Pedagogy of the Oppressed taught educators that,

At the core of the quest for efficacy or social justice are the concepts of humanism and freedom.

When other educators and crusaders took up this clarion call in later years, they also reinforced this formula. In *Teaching to Transgress* (1994) and *Teaching Community: A Pedagogy of Hope* (2003), bell hooks renewed the call for integrating humanism, freedom, and community into the classroom. However we package our educational initiatives, if we embed human dignity, mutual respect, and critical thinking into the formula, we will all be lifelong learners on a common

journey to achieve the best outcomes for our children, families, and communities. ●

The usTHIS ARTICLE WAS FIRST PUBLISHED IN THE CONVERSATION ON APRIL 12, 2021

DEREK CHAUVIN TRIAL: 3 QUESTIONS AMERICA NEEDS TO ASK ABOUT SEEKING RACIAL JUSTICE IN A COURT OF LAW

By Lewis R. Gordon

There is a difference between enforcing the law and being the law. The world is now witnessing another in a long history of struggles for racial justice in which this distinction may be ignored.

Derek Chauvin, a 45-year-old white former Minneapolis police officer, is on trial for second-degree murder, third-degree murder, and second-degree manslaughter for the May 25, 2020, death of George Floyd, a 46-year-old African American man.

There are three questions I find important to consider as the trial unfolds. These questions address the legal, moral and political legitimacy of any verdict in the trial. I offer them from my perspective as an Afro-Jewish philosopher and political thinker who studies oppression, justice and freedom. They also speak to the divergence between how a trial is conducted, what rules govern it – and the larger issue of racial justice raised by George Floyd’s death after Derek Chauvin pressed his knee on Floyd’s neck for more than nine minutes. They are questions that need to be asked:

1. CAN CHAUVIN BE JUDGED AS GUILTY BEYOND A REASONABLE DOUBT?

The presumption of innocence in criminal trials is a feature of the U.S. criminal justice system. And a prosecutor must prove the defendant’s guilt beyond a reasonable doubt to a jury of the defendant’s peers.

The history of the United States reveals, however, that these two conditions apply primarily to white citizens. Black defendants tend to be treated as guilty until proved innocent.

Racism often leads to presumptions of reasonableness and good intentions when defendants and witnesses are white, and irrationality and ill intent when defendants, witnesses and even victims are black.

Additionally, race affects jury selection. The history of all-white juries for black defendants and rarely having black jurors for white ones is evidence of a presumption of white people’s validity of judgment versus that of Black Americans. Doubt can be afforded to a white defendant in circumstances where it would be denied a black one.

Thus, Chauvin, as white, could be granted that exculpating doubt despite the evidence shared before millions of viewers in a live-streamed trial.

2. WHAT IS THE DIFFERENCE BETWEEN FORCE AND VIOLENCE?

The customary questioning of police officers who harm people focuses on their use of what’s called “excessive force.” This presumes the legal legitimacy of using force in the first place in the specific situation.

Violence, however, is the use of illegitimate force. As a result of racism, Black people are often portrayed as preemptively guilty and dangerous. It follows that the perceived threat of danger makes “force” the appropriate description when a police officer claims to be preventing violence.

This understanding makes it difficult to find police officers guilty of violence. To call the act “violence” is to acknowledge that it is improper and thus falls, in the case of physical acts of violence, under the purview of criminal law. Once their use of force is presumed legitimate, the question of degree makes it nearly impossible for jurors to find officers guilty.

Floyd, who was suspected of purchasing items from a store with a counterfeit \$20 bill, was handcuffed and complained of not being able to breathe when Chauvin pulled him from the police vehicle and he fell face down on the ground.

Footage from the incident revealed that Chauvin pressed his knee on Floyd's neck for nine minutes and 29 seconds. Floyd was motionless several minutes in, and he had no pulse when Alexander Kueng, one of the officers, checked. Chauvin didn't remove his knee until paramedics arrived and asked him to get off of Floyd so they could examine the motionless patient.

If force under the circumstances is unwarranted, then its use would constitute violence in both legal and moral senses. Where force is legitimate (for example, to prevent violence) but things go wrong, the presumption is that a mistake, instead of intentional wrongdoing, occurred.

An important, related distinction is between justification and excuse. Violence, if the action is illegitimate, is not justified. Force, however, when justified, can become excessive. The question at that point is whether a reasonable person could understand the excess. That understanding makes the action morally excusable.

3. IS THERE EVER EXCUSABLE POLICE VIOLENCE?

Police are allowed to use force to prevent violence. But at what point does the force become violence? When its use is illegitimate. In U.S. law, the force is illegitimate when done "in the course of committing an offense."

Sgt. David Pleoger, Chauvin's former supervisor, stated in the trial: "When Mr. Floyd was no longer offering up any resistance to the officers, they could have ended their restraint."

Minneapolis Police Chief Medaria Arradondo testified, "To continue to apply that level of force to a person proned-out, handcuffed behind their back, that in no way, shape or form is anything that is by policy." He declared, "I vehemently disagree that that was an appropriate use of force."

That an act was deemed by prosecutors to be violent, defined as an illegitimate use of force resulting in death, is a necessary conclusion for charges of murder and manslaughter. Both require ill intent or, in legal terms, a mens rea ("evil mind"). The absence of a reasonable excuse affects the legal interpretation of the act. That the act was not preventing violence but was, instead, one of committing it, made the action inexcusable.

The Chauvin case, like so many others, leads to the question: What is the difference between enforcing the law and imagining being the law? Enforcing the law means one is acting within the law. That makes the action legitimate. Being the law forces others, even law-abiding people, below the enforcer, subject to their actions.

If no one is equal to or above the enforcer, then the enforcer is raised above the law. Such people would be accountable only to themselves. Police officers and any state officials who believe they are the law, versus implementers or enforcers of the law, place themselves above the law. Legal justice requires pulling such officials back under the jurisdiction of law.

The purpose of a trial is, in principle, to subject the accused to the law instead of placing him, her, or them above it. Where the accused is placed above the law, there is an unjust system of justice. ●

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ARTIFICIAL RETINA ENGINEERED FROM ANCIENT PROTEIN NOW IN SPACE

By David Hutton

The National Institute of Health has supported early testing of the artificial retina. Now, scientists are testing whether manufacturing it on the International Space Station results in a viable treatment for people with blinding eye diseases.

Plans to perfect an artificial retina able to mimic the functions of the light-sensitive tissue at the back of the eye have taken flight, with work now being done in space.

The National Institute of Health is supporting testing on the International Space Station (ISS) to determine whether manufacturing it there results in a successful

treatment option for patients with blinding eye diseases.

According to an NIH release, LambdaVision, a Farmington, Connecticut-based biotech firm that developed the artificial retina, is exploring optimizing production of the artificial retina in space. In a series of missions to the ISS, the company will test whether microgravity on the station provides just the right conditions for constructing the multilayered protein-based artificial retina. The company hopes to restore meaningful vision for patients who are blind or have lost significant sight due to advanced retinal degenerative diseases, including retinitis pigmentosa (RP) and age-related macular degeneration (AMD).

The National Aeronautics and Space Administration (NASA), along with its partner, Space Tango, a Lexington, Kentucky-based firm that provides the logistical support for space-based research, put up a \$5 million commercialization award to LambdaVision to get the project off the ground. LambdaVision also received from NASA a Small Business Innovation Research (SBIR) Phase II award, worth \$750,000 over two years.

The work can go a long way in developing and perfecting the artificial retina.

“When gravity is nearly eliminated, so too are forces such as surface tension, sedimentation, convection driven buoyancy, all of which can interfere with the orientation and alignment important in the creation of crystalline structures, nanoparticles, or improved uniformity in layering processes,” Jana Stoudemire, a commercial innovation officer at Space Tango, said in a statement.

Stoudemire noted that Space Tango is building out not only the feasibility of manufacturing in orbit, but also the good manufacturing practices (GMP) capabilities that enable us to produce products in space for use in people.

“The hope is that surgically placing the artificial retina in the eye will restore vision among people with advanced-stage forms of diseases for which there is no treatment such as retinitis pigmentosa and age-related macular degeneration (AMD), a leading cause of vision loss among people age 50 and older,” Jordan Greco, PhD, chief scientific officer at LambdaVision, said in the NIH statement.

The goal of the project is for the LambdaVision artificial retina to replace the function of photoreceptors in patients who have lost the neurons from disease-related damage.

The National Eye Institute in 2014 gave LambdaVision funding to test a prototype of the artificial retina in animal models.

A LOOK AT THE ARTIFICIAL RETINA

According to LambdaVision, its artificial retina relies on bacteriorhodopsin, a light-activated protein that acts as a proton pump. Bacteriorhodopsin is synthesized by halobacterium salinarum, a microorganism found in extremely salty marshes. Halobacteria are of the Archaea domain, which are among the oldest forms of life on Earth.

Bacteriorhodopsin shares some similarities with rhodopsin, the light-activated visual pigment protein within photoreceptors. Both proteins contain retinal, a chromophore that is key to absorbing light energy. In the case of bacteriorhodopsin, light energy is converted into metabolic energy. When light activates bacteriorhodopsin, hydrogen ions get pumped across a membrane, creating a proton gradient.

Robert Birge, PhD, LambdaVision’s founder and distinguished chair in chemistry at the University of Connecticut, has been studying bacteriorhodopsin for more than 40 years and has made a career of incorporating light-activated proteins into biomolecular electronic and therapeutic applications, including the protein-based artificial retina.

Within LambdaVision’s artificial retina, purified bacteriorhodopsin is layered onto an ion permeable membrane. The layers are repeated multiple times with the aim of absorbing enough light to generate an ion gradient that can stimulate the neural circuitry of the bipolar and retinal ganglion cells within the retina, Greco said in the statement.

Nicole Wagner, PhD, LambdaVision’s president and CEO, noted that in patients who have lost their vision from advanced-stage retinal diseases, the artificial retina would mimic the function of photoreceptors.

“Activated by light entering the eye, the artificial retina pumps protons toward the bipolar and ganglion cells,” she said in a statement. “Receptors on those cells

detect the protons, which triggers them to send signals to the optic nerve, where they travel to the brain.”

For the artificial retina to function, the bacteriorhodopsin molecular structures must be precisely oriented within each layer to create a unidirectional gradient. That exacting degree of orientation may be more easily established in microgravity, and once achieved, Greco anticipates it should persist even after the implants are exposed to gravity on Earth.

According to LambdaVision, it plans to seek FDA approval of the artificial retina for the indication of retinitis pigmentosa. Collection of the preclinical data required to launch a clinical trial is still underway and have yet to be published.

Greco noted that partnering with NASA and Space Tango continues to be an important catalyst towards addressing the production requirements associated with the company’s artificial retina technology.

“Their support and resources offer a unique environment that allows us to generate high-quality artificial retinas that have the potential to restore visual acuity for blind patients,” Greco said in a statement. “While our focus at this time is fully on our ability to restore meaningful sight to patients with retinitis pigmentosa and age-related macular degeneration, we are continually bolstered by the great potential of LEO for broader implications across industries.”

Over the next 3 years, the LambdaVision-Space Tango partnership will serve to evaluate and improve on-orbit production processes, and to produce artificial retinas that will then be evaluated on Earth. Once validated, this process could also provide the foundation for products in a range of industries that could be manufactured in space with potential clinical benefit to patients on Earth. ●

TRILLIONS OF 'BROOD X' CICADAS ARE ABOUT TO EMERGE ACROSS THE U.S. TO SING, MATE AND DIE. HERE'S WHAT TO EXPECT

By Rebecca Katzman

This coming May, millions of people around the United States will have front-row seats to an extraordinary entomological event: Trillions of Brood X cicadas across 15 states will emerge almost synchronously after having spent the last 17 years underground. The males will take up elevated positions, each buzzing as loud as a lawnmower to attract females. After mating, the adult cicadas will die off en masse just about as quickly as they arrived—likely sometime in late June or July—while their offspring tunnel underground, not to emerge until 2038, when the dance will begin anew.

Annual, or “dog day,” cicadas appear across the U.S. every summer, when their signature mating song becomes as much of the seasonal soundscape as a passing ice cream truck. But the cicadas taking center stage in this year’s event—distinctive for their black bodies and red eyes—are part of a periodical “brood” of the insects that emerge in predictable cycles of 13 or 17 years. This year’s brood, Brood X (pronounced “ten”), is one of the largest and most widely distributed; its emergence is expected to be all the buzz from New York to Georgia to well west of the Mississippi River (the Washington, D.C. area is expected to be a particular hotspot). “It’s not something you can ignore,” says John Cooley, a biologist at the University of Connecticut. “When they come out it’ll be millions per acre.”

It’s unclear why periodical cicadas like those of Brood X emerge in such overwhelming numbers, though some scientists believe it’s a survival strategy to overwhelm predators, like birds and snakes. Why they emerge exclusively in prime number year cycles, meanwhile, is what Cooley calls “the question of the hour.” Either way, Michael Raupp, an entomology professor emeritus at the University of Maryland, College Park, says the

cicadas' massive cyclical emergence makes them fascinating to study.

As Raupp describes it, this year's emergence will be full of drama. "There's going to be birth, there's going to be death, there's going to be predation, there's going to be romance, there's going to be sex in the treetops, there are going to be songs," he says. A few weeks before their emergence, the Brood X cicadas—each about the size of a typical human adult's thumb—will begin creating exit holes in the ground, a sign that they're getting ready to emerge. Then, when soil temperatures reach about 64° F, the cicadas will fully dig themselves out. The males will fly to vertical structures like houses and trees and begin their mating song to woo females. "It's going to be a big boy band up in the treetops," says Raupp. "And once they're in the treetops, it's all about romance."

After mating, the female cicadas will deposit hundreds of eggs into nearby tree branches, then tumble to the ground and die. The adult males also die off shortly after emerging. Six to eight weeks later, the eggs will develop into nymphs, which will then fall back to earth and dig themselves underground. That's where they'll spend the next 17 years living what Raupp calls the "dismal existence" of sucking on plant sap until they're ready for their turn in the spotlight (according to one theory, cicada nymphs count the passage of time by monitoring trees' nutrient fluxes or hormonal cycles).

Raupp calls the Brood X spectacle "the Super Bowl for entomologists and natural historians," but they may be pretty much the only people looking forward to the show. Cicadas' buzz can range from annoying to downright deafening, and while not technically pests, they're often confused for locusts, a mix-up that dates back to early North American religious colonists taking them for the feared insects of the biblical plague. However, cicadas don't bite or sting, and they don't devour crops and produce widespread famine—but their eggs *can* damage young trees, unless they're covered in mesh cicada netting.

Still, even if they aren't technically pests, the idea of millions of Brood X cicadas emerging from underground is enough to give almost anybody the heebie-jeebies—especially people who are squeamish about insects to begin with. "For people who have true phobias, it might be time to talk to your counselor," Raupp says. Or, he adds, "get out of town for a while." ●

BETWEEN A ROCK AND A HARD PLACE

By Marilou Newell

We take them for granted. They have become so completely part of the local landscape that they probably don't even register on our conscious minds as we motor along, taking care of our 21st century business. Stone walls are everywhere.

But a mere heartbeat ago in geological time, stone and rock walls served the useful purpose of marking property lines, not because wooden fences couldn't be constructed, but because the stones were in the way of agricultural fields and pastures needed for livestock. Ever resourceful, the stones moved out of necessity were conserved as walls by the settlers.

We know the history, that the rocky soils of New England came about when the glaciers receded and melted away. Millions of tons of stone were left behind. The stone supply was endless.

Tossed stones, known as two-handers because they could be thrown one person using both hands, were piled about thigh high in meandering strips that became walls. Fields required the clearing away of stones each spring as a new unwanted crop of stones seemed to sprout up by black magic. Our forebearers called them "devil stones," believing that Beelzebub himself was pushing them up from the bowels of the earth. In reality, their emergence was the result of heaving created by frost that gave the stones their upward mobility.

Increasingly more land was cleared as demanded by the beef-butter-bacon economy of the 19th century. So writes author and landscape geologist Robert Thorson of the University of Connecticut. Thorson has been studying, educating students and the general public about the importance of stone walls for decades. His fascination with the history, archeology, and geology of stone walls in New England puts him in a unique position as an authority on the topic.

Thorson says that by the mid-19th century, a whopping 70 percent of the New England countryside had been

deforested for fuel, buildings, and farmlands. He said that if we could wander back in time, what we would find as far as the eye could see would be small farm holdings surrounded by “dump walls.” Another whopper of a statistic from Thorson’s research is that some 240,000 miles of stone walls have been erected. That’s 400 million tons, “enough to build the Great Pyramid of Giza 60 times over.”

Speaking of “dump walls,” Thorson has identified several types of stone wall construction. There are the simple dump walls, a classic mounding of stones to mid-thigh in a casual, “I’m tired of moving rocks,” manner. There are the tossed walls, basically the same as dump walls but a bit tidier. There are the neatly fitted single walls, the neatly fitted double walls and, finally, laid walls, which utilized slate and flat stones in a linear fashion.

Thorson writes in his book, *Exploring Stone Walls*, that the tallest stone wall feature is located in Newport, Rhode Island, along the Cliff Walk, and the oldest, built in 1607, has been found in Popham, Maine. He also noted that stone walls provided protection for the minutemen during the Revolutionary War.

Given his rock-solid (pun intended) love for stone walls, Thorson founded the Stone Wall Initiative in 2002 for the continued education and conservation of stone walls in New England.

Both Thorson and researcher Susan Allport, who wrote *Sermons in Stone: The Stone Walls of New England & New York*, said of the stones in their plentitude, they just kept coming.

Here’s a fun fact: The most common stone in New England is granite, but the stone walls of the area are primarily made of gneiss containing banded coarse grains of feldspar, quartz, and mica and/or schist, which is comprised of mudstone or shale with sheet-like grains of muscovite, chlorite, talc, sericite, biotite, and graphite.

Allport’s research discusses the geological history of the stony ground beneath our feet, commenting that their size ranges from massive boulders that seem to have suddenly stopped rolling towards the sea – think Witch Rock in Rochester or the massive boulder behind that home on Church Street in Mattapoisett – to tiny pebbles along the beach. These stones are known as

melt-out till. Logment till is the term used for the rich soils beneath the melt-out till.

While stone walls were continuously built throughout the time of the early settlers until the Industrial Era, Allport reports that most walls were being built in the latter half of the 18th century. She says that by the time Industrial Era walls were abandoned, economic development moved away from an agrarian society to industry, the manufacturing of goods.

The need for heating fuels has had an environmental impact over the centuries that precipitated even greater deforestation than farming had. Changes in the earth’s rotation and ocean currents, as well as volcanic winters, episodes that darkened parts of the planet, all contributed to times of extreme cold weather, including years without a summer growing season.

There were approximately 500 years of weather impact on mankind and its need to survive the cold. As more and more land was cleared, widespread deforestation exposed the soils, causing them to freeze more deeply, thus creating frost heaves that lifted billions of stones to the surface.

The single most pronounced period of stone wall building came between 1775 and 1825, Allport has stated. Thorson agrees, calling it the “golden age of stone building.” After the Revolutionary War, Thorson believes property owners returned to their homes with an increased sense of pride of ownership and rebuilt many dump-style walls into more uniform features.

But what becomes of those remaining stone walls hidden hither and yon throughout our Tri-Town area, walls that haven’t been disturbed by modern day subdivisions or new home construction?

Massachusetts General Law Chapter 266 provides protection for stone walls that have been constructed along designated scenic ways, primarily in municipal easements. Walls on private property appear to have no protection, save for that provided by the property owner. They are, after all, on private property. There are walls yet to be discovered in our region, most assuredly.

Allport’s research included the use of laser mapping technology to locate wall features deep within reforested areas. The visual emergence of long forgotten walls are truly archeological finds, giving us a

better understanding of how our ancestors were using the lands. Allport believes the walls hold the key to New England's social history, including settlement patterns and farming styles, a backdrop against which human activity can be measured.

Each stone was once held by a person, a farmer, a native American, a slave. "What remains are countless individual acts etched upon the landscape – those labors, hundreds of years later, they endure," Allport wrote.

We have always found poetry in our natural world. Robert Frost wrote of "fences making good neighbors" in his poem, "Mending Wall," inspired by a wall dividing his property from his neighbors. Stone walls make us stop and wonder, "Who put this wall here ... when was it built ... what animals are using the crevices as shelter ... will it remain here forever?"

"Stone walls are the most important artifacts of rural New England," Thorson says. "They're a visceral connection to the past. They are just as surely a remnant of a former civilization as a ruin in the Amazon rain forest."

Stone walls are works of art and feats of engineering. They are also a thread to our collective past, like breadcrumbs leading us to a deeper appreciation for those who have gone before us. ●

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HAS ANY US PRESIDENT EVER SERVED MORE THAN EIGHT YEARS?

By David Yalof

The only president in American history to serve more than two four-year terms was Franklin Delano Roosevelt. He actually served three full terms as well as the first three months of a fourth term until his death on April 12, 1945.

The current limits on how long a person can be president come from the 22nd Amendment, added to

the U.S. Constitution in 1951, which limits presidents to two successful presidential elections. The amendment makes one exception: If a president takes office in the middle of someone else's term – if the president dies, for example, and a vice president takes over and serves less than two years, that person can still run twice for their own election. But if the replacement president serves for more than two years of their predecessor's term, they can only be elected to one more presidential term of their own.

FDR wasn't breaking those rules, because the rules did not exist for the first 162 years of the nation's history, from 1789 to 1951. Even so, in all that time, he was the only president who served more than two terms.

A total of 13 presidents have served exactly two full terms. Eight of them came before Roosevelt. George Washington, Thomas Jefferson, James Madison, James Monroe, Andrew Jackson, Ulysses Grant and Woodrow Wilson served their terms consecutively. Grover Cleveland served two terms separated by the four-year term of Benjamin Harrison.

Some considered third terms: In 1880, four years after he finished out his second term, Grant pressed his candidacy once again but failed to secure the Republican Party's presidential nomination. And as Woodrow Wilson finished out his second term in 1920, he also thought about running for a third term, but ultimately withdrew from consideration.

Five more presidents – Dwight Eisenhower, Ronald Reagan, Bill Clinton, George W. Bush and Barack Obama – came after the 22nd Amendment was passed, so they had to leave and let someone else take over.

Four additional presidents – Theodore Roosevelt, Calvin Coolidge, Harry Truman and Lyndon Johnson – completed the remaining terms of another president and were elected to their own full term immediately afterward. Under the rules of their times, each of them could have run for one more term. Several chose not to run for reelection; others ran and lost.

For example, Lyndon Johnson, who took over after John F. Kennedy was assassinated in 1963, initially tried for a second full term in 1968. But during the presidential primaries, he withdrew from consideration, in part because his handling of the war in Vietnam was unpopular and threatened his chances.

The precedent of serving just two terms was originally established by Washington, the nation's first president. By all accounts, Washington would have easily been reelected had he chosen to run a third time.

But he rejected public calls to run for a third term as president in 1796. Washington was concerned that by staying in office longer, he might send a message that presidents should govern until death or illness drove them away, like a king. The American Revolution had just overthrown a monarchy. Washington thus wanted to lead by example in voluntarily leaving office after his second term, retiring to his Mount Vernon estate in Virginia.

After all, if two terms is good enough for George Washington, isn't it good enough for everyone else? ●

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BROOD'S CLUES: NEW MAPPING APPROACH PUTS CICADAS IN FOCUS

By Leslie Mertz, Ph.D.

Vast numbers of creatures are preparing to arise from beneath the ground this year, but it isn't a TV episode of *Stranger Things* or a scene from a vampire movie. Rather, it is the real-life, millions-strong arrival of periodical cicadas, known collectively as Brood X, that emerge en masse every 17 years.

The short-lived show, complete with its deafening racket of buzzy male songs, will only last a few weeks while mating frenzy and egg-laying are accomplished. The adults will then die off, and the larvae will hatch from the eggs and burrow back underground to remain until the next big group emergence in 2038.

Entomologist John Cooley, Ph.D., is especially excited about Brood X this year, because its timing coincides with the release of a new approach that promises a better understanding of cicada broods and whether their ranges are shifting due to climate change or other causes. Cooley, a professor in the Department of Ecology and Evolutionary Biology at the University of

Connecticut-Hartford, is lead author of a report describing the new cicada-mapping approach, published last week in the *Annals of the Entomological Society of America*.

"ENDLESS FASCINATION"

Cooley has been interested in cicadas since his Midwest childhood summers spent listening to the annual summer cicada *Neotibicen pruinosus*, sometimes known as a scissors grinder. "It had dusk choruses of EEEEEEE-oo, EEEEEEE-oo, EEEEEEE-oo that were just mind-blowing," he says. "Then you'd catch them: As nymphs, they're like little tanks, and when they're adults they're these big fight-y insects, so it was endless fascination!"

His enchantment with cicadas continued into college when he began exploring the so-called periodical cicadas, or those that emerge in large groups either every 13 years or every 17 years. Brood X is the most widespread and largest of the emergences, and includes all three of the 17-year-cycle species—*Magicicada septendecim*, *M. cassini*, and *M. septendecula*—that arise together every 17th spring to congregate on trees throughout much of the eastern-central United States. Besides Brood X, 11 additional 17-year broods plus three more 13-year broods of periodical cicadas occur in the United States.

"When you're talking about periodical cicadas, you quickly get into questions about the evolution of the species and the broods, and many of the hypotheses make an appeal to their geographical distribution, or the biogeography," Cooley says. "To do that, you need fine-scale maps, but the maps that were in existence at the time were county-level at best, which are too crude to determine whether broods overlap or ranges are changing or to understand differences in the life cycles of broods (13- versus 17-year cycles) and the potential for gene flow (interbreeding) between different broods or life cycles."

To fix that problem, Cooley and University of Connecticut colleagues Christine Simon, Ph.D., and David Marshall, Ph.D., set out to construct much more precise maps for these intriguing bugs.

ROAD TRIP!

Building better maps meant hitting the road. For the work described in the new paper, the researchers set their sights on Brood VI, which extends over parts of North Carolina, South Carolina, and Georgia, and was due to emerge in 2017. In both 2000 and again in 2017, the researchers spent a month “driving down every little road we could get the car through” to pinpoint the location—aided by GPS technology in 2017—of singing males and listening to song choruses to estimate population size.

The data from these back-to-back Brood VI emergences provided the first published examples of such highly detailed mapping of consecutive periodical cicada brood generations, Cooley says. With such comprehensive information, the researchers not only had a precise picture of the brood’s range boundaries and population density, but they can also now use that as a baseline from which to clearly identify future density changes or range shifts.

One of the most challenging aspects of their work was to delineate range boundaries so they could clearly assess the occurrence of overlaps between neighboring broods or shifts in a brood’s range. After what Cooley described as “a lot of arguing and discussion about it,” the researchers finally settled on a conservative description that would indicate range shifts but wouldn’t show false overlaps. A preliminary analysis of data from Brood VI, as well as soon-to-be-published data they have gathered on other broods, suggests that brood overlaps are rare, which shores up their impressions from the field, Cooley says. “It looks like broods don’t really overlap that much, no matter what the old papers and records say.”

The researchers did, however, notice something odd while they were in the middle of the 2017 Brood VI field work. That year, UConn invited the general public to submit online reports of periodical cicadas. “We became aware that something funny was happening when the website quickly got overwhelmed with reports from Washington, DC, which is way out of range for Brood VI but is within the range of Brood X, so these cicadas in DC were emerging four years early,” Cooley says. “If we begin to see lots of mistakes in counting—and periodical cicadas get to the right number of years not with an internal clock but with a counter (counting seasonal pulses of fluid flow in plant roots)—then

something is going on, and a leading hypothesis is climate change.”

ASKING FOR PUBLIC HELP

This year, Cooley is again encouraging the public to get involved by reporting periodical cicadas via the new Cicada Safari app. “Not only is this the year when Brood X will be coming out, but it’s also four years before the Brood XIV emergence, so if there are any strange, off-cycle emergences of Brood XIV, they’re going to show up this year,” he says.

He adds, “We’d like to get people out there and watching. It’s going to be an exciting year, and hopefully this new Brood VI paper will help us think about how to deal with all the new information that will be coming in.” ●

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‘THAT THING LEAPED!!!’ FUZZY, JUMPING BUG LOOKS UNASSUMING — BUT DON’T TOUCH IT

By Mitchell Willetts

Video taken in South Carolina captured a sight that came as a surprise to viewers: A fuzzy caterpillar, sitting at a ledge, scrunches its little body together like a spring, and suddenly launches itself upward and out of frame.

“Did it hop? Wow!” one person commented on the video shared to Facebook. “I thought the camera just adjusted,” another said. “Nope, that thing leaped!!”

“Omg! It’s beautiful and it has mad hops!” wrote a third. Slow and famously hungry, caterpillars aren’t known for their feats of athleticism, but in reality some “are pretty damn muscular,” David Wagner, professor of ecology and evolutionary biology at the University of Connecticut, told McClatchy News.

While many may not have witnessed a jumping caterpillar before, most also haven't raised tens of thousands of caterpillars, like Wagner has.

"When they decide to throw themselves, they can really launch," he said. "I think it's more common than generally appreciated."

The caterpillar seen in the video will one day become a white-marked tussock moth, if it doesn't throw itself into an anthill first, or get picked off by a pigeon. White-marked tussock moth caterpillars are fine to look at but less fun to touch, as stinging hairs along its body can cause hives and rashes to the skin.

Generally speaking, jumping by caterpillars is rare, said professor Peter Adler of Clemson University's Department of Plant and Environmental Sciences.

"Only a small number of species routinely jump. The best known is the caterpillar that lives in Mexican jumping beans," Adler told McClatchy News.

He's collected a number of white-marked tussock caterpillars over the years, "but I've never seen one jump, as it did [in the video]," he said. It's possible the caterpillar was not in good health, Adler said, victim to an unwelcome guest.

"Perhaps that particular caterpillar was parasitized by a wasp or fly, and the movements of the larval parasite triggered the 'jump,'" he said.

There's no shortage of cruel fates in the animal kingdom, but Wagner doubts a parasite is to blame here. "It looked like a fully fed, healthy caterpillar that was just unhappy with where it was," Wagner said.

Caterpillars don't want to jump, according to Wagner, or at least they prefer not to. It's a risky move and they don't really know where they're going to end up.

"It's kind of like launching yourself into the great unknown," he said. "Generally, caterpillars like to hold their ground. But in dire times they'll launch themselves and wish for the best." They're most likely to take a leap of faith if they're not in a good feeding spot, or if they sense they're about to be eaten.

"It's a great last-ditch effort," Wagner said. It's also possible the white-marked tussock in the video was hoping to find a better place to build a cocoon, pupate, and later emerge as a moth, he said. ●

BILLIONS OF BROOD X CICADAS TO EMERGE IN MAY AND JUNE, BRINGING NOISE OVER 100 DECIBELS

By Nicole Fallert

Billions of cicadas will emerge in select U.S. cities in May and June, and the insects are set to bring noise reaching over 100 decibels.

"Luckily, there is just about zero risk of being kept up at night, because cicadas are generally day-singers," John Cooley, leader of the Periodical Cicada Project at the University of Connecticut, told Newsweek. "They will call at night on especially hot nights, or if there's a bright light, but at reduced intensity."

In the coming weeks, researchers say the red-eyed insect group known as Brood X will emerge from the ground, where they have been nestled for the past 17 years.

Cooley added that the most likely case of Brood X's calls exceeding 100 decibels occurs when the bugs "synchronize their calls—so it's the kind of thing that might happen on those hot, sunny, perfect days."

The bugs wait until the temperature about one foot below ground level reaches 64 degrees Fahrenheit and the air is humid before traveling through tunnels to exit their burrows, the Washington Post reported. The last time the brood emerged in 2004, the majority of the critters came out in mid-May to late May.

The winged creatures will rise up, shed their skin and embark on an extremely loud venture for mates, according to Vox. Only the male bugs sing, reaching sound levels louder than a lawn mower, the Post reported. Because Brood X contains three distance species, males of each species have a distinct call they produce with membranes called tymbals.

Once they mate, females will lay hundreds of eggs in tree branches, and after about three or four weeks, the bugs will die, leaving behind their carcasses, The

Conversation reported. The eggs will hatch about six to 10 weeks later, and the cicada nymphs will fall from the trees, burrow underground and restart the cycle.

And amid changing temperatures due to climate changes, researchers will study if warmer surface temperatures lead to significant shifts in the cicada cycle.

"The cicadas rely on Eastern forests, and there are plenty of studies showing that the forests will be affected by climate change, so it stands to reason that the cicadas will be affected, too," Cooley said to Newsweek.

"One hypothesis that we'll examine this year is whether climate changes are associated with a breakdown in the periodical cicada cycles—whether there are more instances of significant off-cycle emergences now than in the past."

Parts of 15 states could be affected by Brood X, which could appear in groups of 25 or 30 per square foot in some cases, the Post reported. But Brood X doesn't pose a danger to people; the bugs aren't physically equipped to easily break human skin or cause a painful bite, as a bee would.

The density of the Brood X's population serves the bugs' survival. Not only do the masses increase the likelihood of finding a mate, but if a predator eats some of the cicadas, there will be a plethora of survivors to continue mating.

"They don't sting, they don't bite," Greg Cowper, curatorial assistant with the Academy of Natural Sciences of Drexel University's Department of Entomology, told ABC-7 New York. "I just tell people to grab their lawn chair and enjoy the show." ●

WIND FARMS BRING WINDFALLS FOR RURAL SCHOOLS, BUT SCHOOL FINANCE LAWS LIMIT HOW MONEY IS SPENT

By Eric Brunner, Ben Hoen, and Joshua Hyman

On the website for the local school district in Blackwell – a town of just over 300 people in rural Texas – school Superintendent Abe Gott says: "We believe that no matter your dreams, you can achieve them from Blackwell, Texas."

To back that up, the Blackwell Consolidated Independent School District provides a postsecondary scholarship of up to US\$36,000 for graduates from the district's single high school. So far 140 students have benefited from scholarships, according to Gott.

The money that makes this possible came from a \$35 million deal the school district brokered with a wind farm company in 2005, part of the massive growth of that sector in Nolan County and Texas.

The spread of wind energy in rural America has been a financial boon to school districts such as the one in Blackwell. However, because of the complexity of how schools are financed, the impact on student achievement is limited, according to a new study that we conducted as researchers in public finance, education economics and energy policy.

WINDFALL OF WIND TAXES

Nolan County – one of three counties served by the school district – is home to 1,371 wind turbines that generate a maximum of 2,097 megawatts, or enough to power half a million Texas homes per year. That includes the 585-megawatt Sweetwater Wind Farm and the 735-megawatt Horse Hollow project, which was the largest in the world when it came online in 2006.

Over the past 25 years wind energy has blossomed in the United States, rising from less than 2 gigawatts of capacity in 1995 to over 110 GW last year, enough to

meet more than 7% of the entire nation's electricity supply. It provides more than 10% of supply in 14 states, and more than 40% in two of those states — Iowa and Kansas.

By 2020, there were over 1,600 commercial wind installations made up of almost 68,000 individual turbines. The industry is continuing to grow rapidly, with another 200 gigawatts of projects applying for grid connections as of the end of 2020.

With all this rural development come property tax revenues. Wind projects paid an estimated \$1.6 billion in property tax revenues to states and local jurisdictions in 2019.

That is no doubt welcome revenue for school districts in rural areas, which sometimes struggle to generate local tax revenue. But as researchers we wanted to know: How are school districts using wind farm revenues? And is this money helping boost student achievement?

To find out, we collected data on new U.S. wind installations from 1995 through 2017 and tax revenue trends in school districts. We then checked to see if new wind farms led to significant changes in school budgets and how school districts spent their money, such as on things like new buildings, hiring more teachers to reduce class sizes, or boosting teacher salaries.

We found that wind energy installations led to large increases in local revenues to school districts. Schools dramatically increased spending on capital outlays, such as buildings and equipment, but made only modest increases to their operating budgets, like hiring more teachers to reduce class size.

WHEN PRIORITIES AND POLICIES COLLIDE

Numerous studies have shown that smaller class sizes result in better student achievement. So why are districts putting new tax revenues into capital spending rather than class size reduction?

We think it is due to state school finance formulas and state- and county-level tax laws, and the incentives they provide to school administrators.

As wind grew it expanded from only 16 school districts in 1995 to 900 districts spread across 38 states in 2016.

Leading the pack are rural areas of the West, the Midwest and Texas.

The amount of tax revenue a school district gets from a wind energy installation depends on state and local laws and how those laws interact with state school finance formulas.

States use a wide variety of approaches to tax wind farms, ranging from normal property tax treatment to full exemptions. Sometimes wind farms make “payments in lieu of taxes,” known as PILOTs.

Kansas, for example, exempts wind projects from property taxes for the first 10 years. Some wind companies make PILOT payments to hosting counties, but individual school districts are often left out of those deals. Wyoming has a centralized system of school finance, so any revenue generated from wind projects is captured entirely by the state and redistributed to schools following a formula.

Texas, the No. 1 wind energy state, has a complicated system of local taxation of wind farms. Because of the state's school finance system, much of the additional property tax revenue generated by wind installations can be captured by the state.

Texas uses a formula to take money from school districts with high property tax revenues per pupil and give it to poorer districts.

But that does not apply to local property tax revenue dedicated to paying off debt in Texas. So school districts have a strong incentive to borrow money by selling bonds to pay for capital improvements, then use revenues from the wind farms to pay off the bonds.

As a result, school districts in Texas tend to put wind tax revenues into buildings and facilities, rather than into teachers and operations. For example, the Blackwell school district, in addition to its scholarship fund, has spent \$15 million for a new football stadium and academic complex.

IMPACT ON SCHOOL FINANCES

The growth in wind energy development over time and across the country provides an ideal setting to examine how wind energy – or really any outside boost in funding – can impact school district finances and, in turn, student performance.

Our sample included 638 school districts that had a wind energy installation at some point between 1995 and 2017. Not surprisingly, these “wind districts” tend to be smaller and more rural than the average school district.

We found that new wind farms result in large increases in the amount of local revenue that is brought in per student, with only small reductions in state aid. We also found large boosts in per-pupil expenditures. Texas, especially, collected and spent more than other states.

But we found that most of those new expenditures were used for building improvements or new facilities rather than operating or “current” expenses. District spending on buildings went up by as much as 73%, while operating expenditures increased only slightly, by about 2%.

FORMULAS AT PLAY

This allocation of funds seems to be driven in part by the formulas that states use to provide aid to local school districts. States typically reduce the amount of funds they send to a district that sees an increase in local tax revenues, in order to equalize spending.

In some cases, though, that applies only when a district spends more on day-to-day operations, not when it boosts building improvements or new construction. So to avoid losing state aid, districts are more likely to use any new local revenues from wind farms for new buildings or repairs than for operating expenses.

This is exactly what we saw in our study. While school facilities and equipment no doubt improved, new wind farm revenues resulted in little to no change in class sizes or teacher salaries. In line with past research that shows better lower student-to-teacher ratios are clearly connected to student achievement, we found little change in student outcomes.

So while new development from wind energy can significantly boost rural economies and tax revenues, decisions on how the money is used are still made within the constraints of local school finance policy and law. ●

TRILLIONS OF CICADAS ARE COMING TO THE U.S. HERE'S WHY THAT'S A GOOD THING.

Don't be afraid or annoyed of the coming periodical cicadas. It's a once-in-a-17-year chance to enjoy a wondrous natural phenomenon.

By Douglas Main

In the late spring of 1634, pilgrims in Massachusetts witnessed an incredible sight: Millions and millions of winged, red-eyed insects sprung from the earth. Not knowing better, the Puritan immigrants likened them to pestilential swarms from the Old Testament and called them “locusts.”

But they were wrong. This was the first written record of periodical cicadas, seven species of which emerge every 13 or 17 years in the U.S. Midwest and East Coast. This year, trillions of the insects will once again burst from the ground and take to the trees, making loud mating songs as they harmlessly sip tree sap.

The 2021 cicadas, known as Brood X, are the biggest of the 15 known periodical cicada broods. These inch-long insects will soon emerge throughout large swaths of Indiana, Ohio, Pennsylvania, Maryland, Washington D.C., and beyond.

Not everybody is thrilled, with many on social media fearing the shrill sounds of the cicadas, as well as their disgust overall. “If the cicadas ruin summer 2021, I will scream,” said one Twitter user. Even today, nearly 400 years after the Puritans arrived, some Americans still mistakenly refer to the cicadas as locusts, a completely different type of insect that's known for devouring crops.

With cicadas, though, there's nothing to fear—and witnessing such a huge arrival of insects is actually a rare privilege, says Jeffrey Lockwood, an entomologist and professor of natural sciences and humanities at the University of Wyoming

“It’s a phenomenon that ought to generate awe and respect and wonder,” he says.

While not a full account of the trillions of cicadas comprising Brood X, this is one attempt to map the 2004 distribution of the brood across 15 states and Washington, D.C.

“WONDERFULLY HUMBLING”

For one thing, the scale of Brood X is massive, a relic of a time, before European colonization, when North America teemed with insects and other animals. In some forests, up to 1.5 million cicadas can surface in a single acre. By some estimates, there could be several trillion of the insects emerging this summer, Lockwood says.

“We’ve done such a thorough job of decimating the natural world that any organism, at least any animal, that appears in these sorts of numbers—it’s wonderfully humbling,” Lockwood says. It’s a reminder that humans are not the only animal on this planet and that we need to share the space with others, he says.

Richard Karban, an entomologist at University of California, Davis, says that these insects “are the herbivores of eastern forests,” more impressive in number and mass than any other. Although we see them only every 17 years, they are there all the time, slowly growing underground while drinking fluids from tree roots. (Read more about why U.S. cicadas lie dormant for over a decade.)

One study estimated that the total biomass of cicadas in a given area of forest is greater than the biomass of cattle the same area could support if it were turned into pasture. These estimates “are the highest recorded for a terrestrial animal under natural conditions,” the scientists wrote.

“You’re taking insect biomass that’s been underground for years and then quickly moving it aboveground—and this has far-reaching positive impacts,” says Elizabeth Barnes, an entomological educator at Purdue University

Besides being a source of food for predators, the cicadas’ emergence helps move nutrients around the ecosystem, aerate the soil, and relieve predatory pressure on non-cicada insect populations, she says.

WHY 17 YEARS?

There are about 3,000 cicada species on Earth, but only seven are periodical cicadas, which are unusual in that they come out every 13 or 17 years and are almost all found in North America. But why do they choose such long time periods, which are both prime numbers?

There are several theories. One is that these periods evolved to optimally avoid predators, Barnes says. The second is that by using prime numbers, the periodical cicadas minimize overlap with other periodical cicadas, thus avoiding genetic hybridization and competition for resources.

But these theories are speculation, Karban says, as there’s currently no real way to test them.

FOOLHARDY BUGS

Another unusual aspect of the insects’ behavior is that, unlike almost all other non-noxious insects, “they do very little to escape predators,” Karban says, which is why some call them foolhardy in the face of a hungry animal.

“Anything with a mouth is going to eat them, so it’s going to be a good year to be a bird” or any other predator, says John Cooley, an entomologist at the University of Connecticut.

The synchronized swan song of such large masses likely evolved because they overwhelm predators, becoming so numerous that only a small percentage of the total can be eaten. (Check out these cicada recipes.)

This phenomenon, and the loud noises they make, is all about procreation, Lockwood adds. “They’re coming out in the biggest orgy that you’ll see in your lifetime,” he says.

INCREDIBLE PHENOMENON

The least we can do is not be afraid. “They don’t sting, they don’t bite, they’re not going to try to come after you,” Barnes says. Fear of insects generally comes from a lack of education and experience, she adds.

“I think Americans in particular are kind of trained to abhor insects—they don’t have a lot of contact with them and think of them as being dirty,” Cooley says. (Learn more: Murder hornet mania highlights dangers of fearing insects.)

But Brood X's arrival is a chance to change that, Cooley says, by stopping to take a closer look at cicadas and appreciating their long, synchronized life cycles, including their brief, four-to-six weeks of life aboveground.

People should also appreciate that these insects have been around for about five million years, about the time that the ancestors of humans and chimpanzees split from one another, Cooley says.

The Brood X emergence offers hope, too, he says: "It's an indication that the forests are healthy enough to function." ●

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NATURE AT ITS CRAZIEST: TRILLIONS OF CICADAS ABOUT TO EMERGE

By Seth Borenstein

Sifting through a shovel load of dirt in a suburban backyard, Michael Raupp and Paula Shrewsbury find their quarry: a cicada nymph.

And then another. And another. And four more.

In maybe a third of a square foot of dirt, the University of Maryland entomologists find at least seven cicadas -- a rate just shy of a million per acre. A nearby yard yielded a rate closer to 1.5 million.

And there's much more afoot. Trillions of the red-eyed black bugs are coming, scientists say.

Within days, a couple weeks at most, the cicadas of Brood X (the X is the Roman numeral for 10) will emerge after 17 years underground. There are many broods of periodic cicadas that appear on rigid schedules in different years, but this is one of the largest and most noticeable. They'll be in 15 states from Indiana to Georgia to New York; they're coming out now in mass numbers in Tennessee and North Carolina.

When the entire brood emerges, backyards can look like undulating waves, and the bug chorus is lawnmower loud.

The cicadas will mostly come out at dusk to try to avoid everything that wants to eat them, squiggling out of holes in the ground. They'll try to climb up trees or anything vertical, including Raupp and Shrewsbury. Once off the ground, they shed their skins and try to survive that vulnerable stage before they become dinner to a host of critters including ants, birds, dogs, cats and Raupp.

It's one of nature's weirdest events, featuring sex, a race against death, evolution and what can sound like a bad science fiction movie soundtrack.

Some people may be repulsed. Psychiatrists are calling entomologists worrying about their patients, Shrewsbury said. But scientists say the arrival of Brood X is a sign that despite pollution, climate change and dramatic biodiversity loss, something is still right with nature. And it's quite a show.

Raupp presents the narrative of cicada's lifespan with all the verve of a Hollywood blockbuster:

"You've got a creature that spends 17 years in a COVID-like existence, isolated underground sucking on plant sap, right? In the 17th year these teenagers are going to come out of the earth by the billions if not trillions. They're going to try to best everything on the planet that wants to eat them during this critical period of the nighttime when they're just trying to grow up, they're just trying to be adults, shed that skin, get their wings, go up into the treetops, escape their predators," he says.

"Once in the treetops, hey, it's all going to be about romance. It's only the males that sing. It's going to be a big boy band up there as the males try to woo those females, try to convince that special someone that she should be the mother of his nymphs. He's going to perform, sing songs. If she likes it, she's going to click her wings. They're going to have some wild sex in the treetop.

"Then she's going to move out to the small branches, lay their eggs. Then it's all going to be over in a matter of weeks. They're going to tumble down. They're going to basically fertilize the very plants from which they were spawned. Six weeks later the tiny nymphs are

going to tumble 80 feet from the treetops, bounce twice, burrow down into the soil, go back underground for another 17 years.”

“This,” Raupp says, “is one of the craziest life cycles of any creature on the planet.”

America is the only place in the world that has periodic cicadas that stay underground for either 13 or 17 years, says entomologist John Cooley of the University of Connecticut.

The bugs only emerge in large numbers when the ground temperature reaches 64 degrees. That’s happening earlier in the calendar in recent years because of climate change, says entomologist Gene Kritsky. Before 1950 they used to emerge at the end of May; now they’re coming out weeks earlier.

Though there have been some early bugs in Maryland and Ohio, soil temperatures have been in the low 60s. So Raupp and other scientists believe the big emergence is days away -- a week or two, max.

Cicadas who come out early don’t survive. They’re quickly eaten by predators. Cicadas evolved a key survival technique: overwhelming numbers. There’s just too many of them to all get eaten when they all emerge at once, so some will survive and reproduce, Raupp says.

This is not an invasion. The cicadas have been here the entire time, quietly feeding off tree roots underground, not asleep, just moving slowly waiting for their body clocks tell them it is time to come out and breed. They’ve been in America for millions of years, far longer than people.

When they emerge, it gets noisy -- 105 decibels noisy, like “a singles bar gone horribly, horribly wrong,” Cooley says. There are three distinct cicada species and each has its own mating song.

They aren’t locusts and the only plants they damage are young trees, which can be netted. The year after a big batch of cicadas, trees actually do better because dead bugs serve as fertilizer, Kritsky says.

People tend to be scared of the wrong insects, says University of Illinois entomologist May Berenbaum. The mosquito kills more people than any other animals because of malaria and other diseases. Yet some people really dread the cicada emergence, she said.

“I think it’s the fact that they’re an inconvenience. Also, when they die in mass numbers they smell bad,” Berenbaum says. “They really disrupt our sense of order.”

But others are fond of cicadas -- and even munch on them, using recipes like those in a University of Maryland cookbook. And for scientists like Cooley, there is a real beauty in their life cycle.

“This is a feel-good story, folks. It really is and it’s in a year we need more,” he says. “When they come out, it’s a great sign that forests are in good shape. All is as it is supposed to be.” ●

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FOR BLACK WORKERS, AGE DISCRIMINATION STRIKES TWICE

Once when they’re entering the workforce, and once when they’re nearing retirement

By Andrew Van Dam

Age discrimination sounds simple: The oldest workers face the strongest biases. But new research suggests that rule applies primarily to White workers. For Black workers, age discrimination is highest for the youngest, falls in middle age, and rises once more as workers near retirement.

A new experiment at Texas A&M University helps illustrate the surprising pattern, which has not been widely studied but tends to line up with Labor Department data reviewed by The Washington Post: Black workers are typically less likely to be hired than White workers with the same experience, but the gap closes in middle age.

This discrimination trend helps explain why youth unemployment among Black workers remains distressingly high. It contributes toward giving White workers a big head start in the workforce and depresses Black lifetime earnings — yet another reason a typical

White family has eight times the wealth of a typical Black family in America.

The research also adds a new layer of understanding about discrimination in the workplace for younger Black workers who typically face the highest levels of unemployment for any demographic.

Economists, sociologists and Black workers attribute the pattern to stereotypes about young Black people, particularly men, as well as to systemic factors that lead to more middle-aged Black workers being overqualified for the jobs to which they're applying.

When he saw the chart above, University of Connecticut sociologist Matthew Hughey was struck by the steadiness of the trend for Whites, compared to the volatile swoop of the line representing Black workers. It shows hiring managers tend to accept White applicants at face value while subconsciously scrutinizing Black ones, he said.

"Black people have always been more objectified, scrutinized and surveilled than White people," Hughey said. "Every little thing is nitpicked on a résumé or explained as a possible red flag."

The larger pattern is common in government data, but the chart comes from a new analysis in the *Journal of Policy and Management* from Texas A&M economist Joanna Lahey, a widely cited authority on discrimination in the labor market. Lahey noticed the counterintuitive pattern of age discrimination against Black workers when she and her collaborator, Douglas Oxley, asked about 150 business and MBA students to evaluate about 40 résumés each. About a quarter of the students had previously screened résumés in the real world, and 11 percent had experience in human resources.

The screeners were given the job requirements for an entry level administrative assistant position and asked to evaluate résumés with those qualifications in mind. The résumés they pored over were designed to be, on average, equal in everything but race and age, which were signaled by name and date of high school graduation, respectively.

For White résumés, ratings steadily declined until workers reached retirement age, reflecting negative stereotypes about older workers. But for Black résumés, the lowest ratings came for workers under age 40. If applicants were middle-aged, students rated Black

workers higher than White ones for this hypothetical entry-level position.

EXPLAINING THE AGE DIFFERENCES

Florida State University economist Patrick L. Mason has long been cited for his work on the experience of Black Americans in the labor market. Like many African Americans interviewed for this story, Mason was skeptical, based on personal experience and labor-market data, that hiring managers would actually prefer middle-aged Black workers over their White peers.

Data from the Bureau of Labor Statistics supports this observation, to a point. It shows the employment gap between White and Black workers narrows in middle age, especially for women, but it rarely closes entirely.

A similar pattern arises in unemployment rates by industry. These rates also show that the gap between Black men and women can, in part, be explained by Black men's predominance in production industries, such as manufacturing and construction, which tend to show bigger gaps between White and Black workers.

The difference could have arisen because subjects in the Texas A&M experiment were told they were hiring for an entry-level job, said NYU sociologist Shatima Jones.

Employers tend to assume White workers come from a more privileged background, so when they see them apply for an entry-level job in middle age, they may think there's something wrong with them. When White people are applying for an entry-level job in middle age, employers will think, "Why are you here? You should have accomplished more," Jones said. But when they see a Black person applying for the same job, their expectations fall, and they implicitly accept that this middle-aged person should be doing entry-level work.

Florida State economist Patrick Mason, who has for decades researched the experience of Black Americans in the labor force, agreed. He said that while young White managers doing the hiring probably couldn't imagine their own parents doing a menial job, they might find it easier to imagine a Black person their parents' age doing that same work.

In the *American Economic Review*, economists at the University of Pennsylvania's Wharton School revealed deep unconscious biases by turning campus recruiting at the school into a real-world experiment. They asked

employers to rate hypothetical résumés, and the ratings were used to match employers with actual job candidates. Recruiters hiring for STEM fields rated White men higher than identical women and minorities, despite saying they preferred diverse candidates, and employers tended to give White men more credit for prestigious internships.

Mason echoed many others when he said he wasn't surprised to see young Black men facing the most discrimination of any group, even as young White men and women faced the least.

"My suspicion is that if you ask most people to describe a criminal, they're going to describe a young Black male," Mason said. "[It's] the harshest, most negative stereotype."

It appears to be widespread in the workplace. The late Harvard sociologist Devah Pager found employers were more likely to hire a White man with a felony conviction than a Black man with no criminal record at all, meaning the penalty for being a Black man was greater than the penalty for being a felon.

CULTURAL EXPLANATIONS FOR THE MIDDLE-AGED BUMP

Hughey, the University of Connecticut sociologist, has long analyzed racial attitudes and ideologies in White communities. He said employers' preference for middle-aged Black workers should be seen an exception to the rule that, "for the most part, Black people are seen as really not a good fit in the economy."

"White people are more likely to apply negative stereotypes to young adults and middle-aged Black people, compared to older Black people," said Hughey, who has closely observed how Black people are discussed within White groups for his research. "This was particularly true when White people described Black people with which they worked or would potentially hire or fire."

As Black workers near retirement age, the data shows, discrimination rises. Employers may avoid older Black workers because of the well-documented health challenges they face — they may fear Black workers of a certain age are more vulnerable to health-related absenteeism, economists said.

"Black workers also face a ton of barriers to working longer that aren't there for White workers," said Geoffrey Sanzenbacher, Boston College economist and fellow at the Center for Retirement Research. "Black workers typically have less education and therefore are often doing jobs that are more physical."

He said the discrimination Black workers face ultimately gives them fewer assets and income in retirement. It makes them less likely to work, and pushes Black men and women into lower-quality jobs. It means they're less likely to have a 401(k) and less able to save.

"This isn't just about the wage gap. It's about the intergenerational wealth gap and how inequality is exacerbated more and more over time," Hughey said.

THE COHORT EFFECT

Some economists point to another reason discrimination against Black workers could fall as they near middle age: Employers might perceive them to be a bargain. As a Black worker ages, he or she will on average work for less pay than a White worker with similar qualifications. Black workers we spoke with were quick to acknowledge that during the prime of their careers, in middle age, they were underpaid and underpromoted. Yet, they were skeptical that this gave them any advantage in the labor market.

"There is a pattern of Black people coming in with a lot to put on the table — in terms of education, drive, all those things — and they get passed over for someone who might not have half their education," said Michael Walls, 65, of Madison, Wis.

Walls vividly remembers when his White manager left and the inventory-control department he worked for eliminated the position instead of promoting him. Walls was the only other employee in the department, and he'd been covering his manager's responsibilities for years. In fact, he ended up training new staff on the department's forklifts and software; he just didn't get a manager's pay for his efforts.

"That's what we're up against," Walls said, adding that it's hard to tell if your individual setbacks are driven by systemic racism, even if the statistics are clear at the national level. "It's so subtle. A lot of this stuff is so subtle."

This sort of story is common among older cohorts of Black workers, many of whom entered the workforce while the vestiges of Jim Crow still loomed large. They have been denied so many opportunities that even the most talented among them could be applying for entry-level jobs like the ones in the Texas A&M study.

“These are people who, if they had the same opportunities that we have today — they would be doctors and lawyers. And instead, they have a high school education,” Lahey said. “So you’re getting an extremely high-quality worker with these cohorts because they didn’t have opportunities that they should have had.”

Boston College’s Sanzenbacher noted that a disproportionate share of young Black people, particularly Black men, face early incarceration, or even death. Despite years of falling incarceration rates, Black Americans are still imprisoned at five times the rate of their White peers, according to a Pew Research Center analysis of data from the Bureau of Justice Statistics. Among people age 15 to 24, Black men face the second-highest death rate of any group — just behind Native American men, according to the Centers for Disease Control and Prevention. They die at nearly double the rate of their White peers.

“If you’re a Black man in middle age,” Sanzenbacher said, “an employer knows you’ve avoided those things. ... They’ve avoided these pitfalls that our society has created for young Black men.”

Walls said he dodged many of the forces that keep his Black peers from working, such as criminal records and bad credit. He credits that to his early experience in the armed services.

Even when Black workers do climb the career ladder, their positions are more precarious, said Darrell Nelson, 65. He’s retired now, but in his time in the telecom industry, Nelson went through a major merger and saw what it did to his colleagues.

“There were a lot of structural changes, and in a lot of those changes, I saw a lot of Black folks being eliminated,” Nelson said. He added that it was partly because Black workers were less able or willing to move when the company demanded relocations.

“Black folks have to work twice as hard and twice as long, hours-wise, and put out a product twice as good

as our White counterparts just to be considered equal or slightly better,” Nelson said.

The Texas A&M experiment did not include enough Black résumé screeners to calculate how a Black person would rate a Black applicant, but Lahey said that her results showed the same pattern of race and age discrimination whether you looked at Hispanic screeners, older screeners or screeners with real-world hiring experience.

Like the Texas A&M experiment, the real world has reflected a shortage of Black people in positions with hiring authority. Before she retired as a vice president at the Asthma and Allergy Foundation of America, Charlotte Collins, 68, got used to being the lone Black woman in corporate situations.

Collins said the biggest barrier keeping women like her out of the C-Suite and off corporate boards was the recruitment process, which tends to follow the same established (White, male) networks it always has.

“I had to say, ‘I want to have representation of non-Whites and women. Don’t bring me a file full of White men. You’ve got to try harder.’ That whole business is just about building relationships,” she said.

Collins wondered what Lahey’s study would have shown if all of the people who reviewed résumés had been Black women, preferably over age 40. If more women like her were in hiring positions, Collins said, it would begin to change the skills and backgrounds valued by corporate recruiters. ●

DINOFLLAGELLATE GENOME STRUCTURE UNLIKE ANY OTHER KNOWN

The transcription of DNA drives the remarkably tidy organization of chromosomes in the dinofllagellate *Symbiodinium microadriaticum*.

By Amanda Heidt

An international team of researchers has generated the most robust genome to date of the dinofllagellate *Symbiodinium microadriaticum*, a species involved in a life-supporting symbiosis with corals.

While the updated genome confirms some of what has been suggested by previous work, an unusual relationship between DNA transcription and the shape and organization of their chromosomes reveals that dinofllagellates harbor some of the strangest genomes in the eukaryotic world, according to findings published April 29 in *Nature Genetics*.

Rather than the flexible, X-shaped chromosomes familiar to humans, dinofllagellates organize their genetic material in orderly blocks along rigid, rod-shaped chromosomes. Genes within blocks are consistently transcribed in one direction and rarely interact with others outside their immediate vicinity. This odd arrangement, the authors found, influences the three-dimensional structure of the entire chromosome.

“This is definitely a breakthrough within the field. We’ve been generating assemblies for these microalgae for a few years now . . . but the quality of those genomes has made them very difficult to work with,” says Raúl González-Pech, a computational biologist and postdoc at the University of South Florida who was not involved in the work. “This genome assembly is particularly good because it has incorporated new sequencing technologies to get a higher resolution, which will allow us to go deeper into analyses of different aspects of [dinofllagellate] biology and evolution.”

We normally think of genomes as something very static, but dinofllagellates have shown me that they are incredibly plastic.

—Raúl González-Pech, University of South Florida

Dinofllagellates are best known for their relationship to corals. In exchange for a safe home, the single-cell microalgae provide the coral with photosynthetic nutrients. When corals bleach, it’s because they’re expelling their symbionts in response to stress. But dinofllagellates as a group are diverse, with some nonsymbiotic species causing prolific red tides, while others are common parasites of crustaceans.

At least some of this diversity is tied to their strange genetic makeup. Their genomes, for one, are massive. *S. microadriaticum*’s genome is relatively small among dinofllagellates, but it’s still one-third the size of the human genome. And rather than regulate gene expression only through transcription, dinofllagellates also engage in rampant gene and chromosome duplication, making genome assembly a nightmarish effort for geneticists—putting the puzzle together is more difficult when many of the pieces look identical.

Until very recently, it was also thought that dinofllagellates lacked the histones that condense and package DNA and are present in all other eukaryotes. While recent studies have found that they do in fact have histones, they likely don’t serve the same purpose. Ordinarily, histones work like spools, allowing DNA to wind and unwind to become more or less accessible to transcriptional machinery as needed. In contrast, dinofllagellate chromosomes seem to be perpetually condensed into a crystalline structure, leaving unanswered questions about how their DNA is organized and how it can be accessed for transcription.

“They don’t fit with everything else we know about eukaryotes—how they structure their chromosomes, how they structure their genomes, how they regulate transcription,” Manuel Aranda, a functional geneticist at King Abdullah University of Science and Technology in Saudi Arabia and an author of the new study.

The same day that Aranda’s paper was published, another study, led by a team of researchers from Stanford University, reported a similar analysis of the genome of the closely related dinofllagellate *Breviolum minutum*. Both teams relied on sequencing approaches that generate longer reads and used an analysis

called Hi-C to assemble and study their genomes. Hi-C infers how often any two sequences interact with one another. In theory, the closer two loci are on a chromosome, the more likely they should be to interact, while sequences that are further away, or on different chromosomes altogether, might never interact at all. Based on these interaction frequency maps, researchers can piece together the genome and make educated guesses as to the shape and three-dimensional structure of the chromosomes.

Aranda's Hi-C analysis concluded that *S. microadriaticum* has roughly 94 rigid, rod-shaped chromosomes that include more than 600 million base pairs. Gene density increased near the telomeres at the chromosomes' tips, and some chromosomes were enriched for genes related to specific functions or pathways. This finding lends support to a longstanding idea that dinoflagellates may organize their genes like bacterial operons, clusters of related genes that are under the control of the same regulatory machinery and therefore expressed together.

The team also identified an unusual pattern within each chromosome of "alternating unidirectional blocks" of genes, the authors write in the paper. Two blocks sitting next to each other on a chromosome make up what the researchers called a domain, and genes within a domain frequently interact with one another and rarely with those in other domains. At the ends of each domain, the researchers surmised, are some sort of physical boundaries that acted as bookends, although it's not clear what creates these boundaries. While the orientation of genes on a chromosome is usually random, in the case of the dinoflagellate, one block in the domain was consistently transcribed in one direction while the other block was transcribed in the opposite direction.

What drove the evolution of this unique pattern remains unknown, although it isn't an entirely novel finding, says Senjie Lin, a phytoplankton ecologist at the University of Connecticut who studies dinoflagellate genomics but was not involved in the current work. Previous research using microscopy to visualize dinoflagellate chromosomes noted that these blocks often appeared as dark, evenly spaced bars. "What's good about this paper is now you see it from the sequence perspective, whereas previously it was more the structural perspective," Lin tells *The Scientist*. The team studying the *B. minutum* genome noted same

organizational pattern, referring to paired blocks as dinoflagellate topologically associating domains, or dinoTADs.

Something that is new, Lin and González-Pech agree, is the correlational link between gene transcription and chromosomal structure and folding found in Aranda's study. As the two blocks in each domain untwisted during transcription, the DNA outside the boundaries remained fixed. This caused a buildup of twisting at those boundaries. Imagine pulling apart strands of yarn or embroidery thread from the middle, while holding the ends in place; the sides will twist tighter as the center is unwound. Consequently, Aranda says, "you end up with these two opposing twirls within the domain that create the structure, which then creates the domain boundaries."

When the team treated dinoflagellates with an inhibitor to block transcription, the boundaries between domains disappeared, suggesting that for dinoflagellates, transcription and chromosomal structure are intimately linked. Whatever is happening at those boundaries "must be something really important in organizing the chromosome," Lin says, and "may be important in regulating gene expression.

The mystery of the domain boundaries is just one of many new questions researchers would like to answer using these new, high-quality genomes.

Lin previously sequenced the genome of *Fugacium kawagutii*, another coral symbiont that is closely related to *Symbiodinium*. Despite the ecological similarities between the two, when Lin used Hi-C to analyze the genome, he found only 30 chromosomes—far less than *S. microadriaticum*'s 94—and the chromosomes of *F. kawagutii* were much longer on average. The handful of dinoflagellates that have been sequenced show that massive restructuring is likely the rule, rather than the exception, says González-Pech, and as more genomes are analyzed, comparative genomics will become a valuable tool for understanding why.

"We normally think of genomes as something very static, but dinoflagellates have shown me that they are incredibly plastic, that they really represent the boundaries of that plasticity in eukaryotes," González-Pech tells *The Scientist*. "We're already pushing boundaries here inside the family, so now we can start

going for larger, more-complex dinoflagellate genomes. I think that's coming up." ●

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MEN WHO DO THIS WITH MONEY ARE 5 TIMES MORE LIKELY TO CHEAT, STUDY SAYS

By Kali Coleman

It's devastating to discover that your partner is a cheater, but unfortunately, it happens more often than we'd like to believe. According to 2016 survey by YouGov, around one in five people say they have cheated on at least one partner. There are countless reasons why people decide to stray, and it's impossible to know for sure if your partner could betray you, but research has found that there are some common traits among cheaters. In fact, one study found that men with one money habit are five times more likely to cheat: If you're financially supporting your partner, you might want to keep an eye out.

A 2010 study presented at the 105th Annual Meeting of the American Sociological Association found that the more economically dependent a man is on his female partner, the more likely he is to cheat on her.

Study author Christin Munsch, PhD, an assistant professor of sociology at the University of Connecticut, examined data for more than 1,000 men and 1,500 women aged 18 to 28, who were either married or cohabitating with the same partner for at least a year. She found that the men who were completely dependent on their female partner's income were five times more likely to cheat than men who contributed an equal amount of money to the relationship.

At the same time, men who made significantly more than their partners were also more likely to cheat. A man was least likely to cheat when his income was higher than his partner's, but his partner still made around 75 percent of that income.

"At one end of the spectrum, making less money than a female partner may threaten men's gender identity by calling into question the traditional notion of men as breadwinners," Munsch said. "At the other end of the spectrum, men who make a lot more money than their partners may be in jobs that offer more opportunities for cheating like long work hours, travel, and higher incomes that make cheating easier to conceal."

Women who were more financially dependent on their male partners were not more likely to cheat, on the other hand. "For women, economic dependency seems to have the opposite effect: The more dependent they are on their male partners, the less likely they are to engage in infidelity," Munsch said in a statement.

According to the study, women who were completely dependent on their male partner's income were 50 percent less likely to cheat than women who made the same amount of money as their partner. Meanwhile women who made most or all of the income household were 75 percent less likely to cheat on their partner.

"For women, making less money than a male partner is not threatening, it is the status quo," Munsch explained in a statement. "More importantly, economically dependent women may encounter fewer opportunities to cheat, and they may make a calculated decision that cheating just isn't worth it." ●

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THE CASE OF THE DISAPPEARING CICADAS

The insect cohort known as Brood X may not emerge on Long Island, a sign of humanity's effects on even nature's most reliable periodic events.

By Cara Giaimo

On a bright day in July 1987, Elias Bonaros, then 15 years old, grabbed a bucket and headed from his home in Bayside, Queens, to Ronkonkoma, a town 40 miles to the east on Long Island. Dr. Bonaros — now a cardiologist, then a budding naturalist — wanted to see

the huge, raucous group of periodical cicadas known as Brood X, which were due to come up in the town.

When he arrived, he found the streets quiet and littered with empty nymph shells. Residents informed him he was a couple of weeks late. “It was heartbreaking,” Dr. Bonaros — who still lives in Bayside — recalled recently. He comforted himself with the knowledge that periodical cicadas are predictable: This brood’s descendants, he figured, would keep resurfacing in Long Island for the foreseeable future.

Alas, he may have missed his chance. The cicadas of Brood X are again expected to emerge across the eastern United States in the coming weeks, as they have every 17 years for millennia. (Things have already kicked off in Georgia and Tennessee.) But researchers and other devotees fear that some parts of the country, including all of Long Island, may have lost their local outposts of this famous cohort of insects.

Humans know and have named periodical cicadas for their clockwork-like timing. But our species’ activities have been messing with that regularity by trapping the insects underground, taking away their food and throwing off their schedules.

Development, pesticide use and the presence of invasive species are destroying historic populations of Brood X cicadas, while climate change spurs bugs from different broods to come up years early, experts say. The disruption of these cycles means some places that were expecting cicadas this year will miss out, while others may be surprised by an unscheduled emergence.

Although these changes are likely happening across the cicadas’ range, they’re particularly visible on Long Island, said Chris Simon, a professor at the University of Connecticut who has been studying cicadas for over 40 years. Long Island was once New York’s last remaining stronghold of Brood X. But the population there has declined in recent decades, and was nearly absent during the last mass emergence in 2004. At the same time, some of the area’s Brood XIV cicadas — scheduled to come up four years from now — may make an early appearance this year instead.

In the coming weeks, with the help of community members, researchers are determined “to confirm or deny Brood X’s Long Island demise,” Dr. Simon said. A diagnosis there may shed light on what’s in store for these bugs around the country. It also illustrates the toll

that human activity can take even on one of nature’s most dependable emissaries — one that can serve as a “canary in a coal mine” for ecological change writ large, she said.

BOOM AND BUST

All cicadas spend the majority of their lives underground, tunneling and sipping sap from plant and tree roots. While individuals from annual cicada species emerge sporadically after three to five years under the soil, the species known as periodical cicadas erupt en masse like stovetop popcorn every 13 or 17 years. Because loud, unwieldy bugs are easy pickings for predators like birds and dogs, emerging in sync helps ensure that a critical mass survives to procreate, Dr. Simon said. It also makes for cacophonous bacchanals that delight insect lovers.

Scientists have sorted North America’s periodical cicadas into groups called broods, delineated by Roman numerals. Brood X, pronounced “Brood Ten,” is one of the best-known — likely because of its large geographic spread, which covers 14 states and includes major media hubs like Washington, D.C., said Dan Mozgai, who runs the website Cicadamania.com. (It’s also “the best branded in terms of a name,” Mr. Mozgai said.)

In the past, Long Island has been the easternmost place that can lay claim to this eminent brood. As far back as 1902, New York’s state entomologist recorded Brood X cicadas in both Suffolk and Nassau counties, Dr. Simon said. Their reign continued through 1987, when the young Dr. Bonaros found the streets of Ronkonkoma filled with castoff cicada shells.

Then came 2004. Dr. Bonaros, who in the intervening years had brushed up on his timing, returned to Ronkonkoma. “I drove around and unfortunately found absolutely nothing,” he said. “They did not make an appearance.”

The brood was absent from more places where it was expected, including in the towns of Shirley and Oakdale, and made only a brief showing in other locations, such as Connetquot State Park, a 3,700-acre reserve south of the Long Island Expressway, said Dr. Simon. Steep declines like this often lead to a complete disappearance, she said — without strength in numbers, the whole population can be devoured.

This year, Dr. Simon and other researchers are encouraging people in and around Long Island to go searching for the insects, and to use an app, Cicada Safari, to report any findings. If they do show up, it will likely be in early June. But she is not optimistic. “I’m afraid that they’re going to be completely gone,” she said.

SLOW INSECTS, FAST WORLD

There are four periodical cicada broods currently in Long Island, all timed to emerge in different years. There as elsewhere, females lay their eggs in tree crevices. In midsummer, newly hatched nymphs crawl down the trunks, burrow into the soil, and find a root to suck on. There they grow larger, noting the changing seasons until 17 winters have passed — their cue to come back up.

Often, though, the world above is less patient. Roads and buildings can literally trap whole populations underground — one Long Island location where the insects once thrived is now “a Walmart with a big parking lot,” Dr. Simon said. Even before they find themselves sealed in by asphalt, the clear-cutting of trees they rely on for food generally dooms them. For this reason, they also find it hard to survive in places that have been turned into golf courses, playing fields and cemeteries.

In the past century, news outlets tracking Brood X’s impact on people on Long Island have also illustrated how land use there changed over time. In 1919, farmers in Farmingdale and Massapequa reported cicada damage to their fruit trees. Seventeen years later, in 1936, The Times warned motorists that the cicadas coming up from roadside forests might clog their radiators. By 1987, Long Islanders were quoted expressing wonderment — along with concern for their lawns — as the insects erupted from their yards.

Farmingdale and Massapequa “are no longer farmland and open space,” said Jody Gangloff-Kaufmann, an entomologist at Cornell University and a Long Island resident. “They’re just home after home after home.” Pesticide use and pollution might have contributed to the declines as well, she said.

Once numbers drop, the final blow can be dealt by predators — including introduced species, which often

lack predators of their own and can throw food webs off balance. In 2016, Dr. Bonaros watched nonnative European starlings and English sparrows go after the dregs of Brood V, also disappearing from Long Island. “They really tear into them and demolish them,” he said.

As with insect declines more widely, experts still find some elements of Brood X’s depletion mysterious. For instance, Dr. Simon said she was unsure why it has largely disappeared from Connetquot State Park, which has been untouched by development.

But it’s probably the same combination of known and unknown factors that already drove two other Long Island broods, Brood I and Brood IX, to extinction before the 1980s. And based on its latest performance, Brood V, previously recorded closer to the island’s North Fork, may also fail to emerge in the near future, she said.

BELLWETHER BUGS

Periodical cicadas are likely experiencing similar declines across the country, driven by similar forces, Dr. Simon said. The unique thing about Long Island is that people can track it so clearly. The area has some of the most thoroughly and consistently mapped broods in the country, a result of the work of William T. Davis, an early 20th century naturalist. Periodical cicadas still present on Long Island are in “exactly the same places where he mapped them,” Dr. Simon said, allowing researchers to closely track declines.

Bug-loving Long Islanders, as well as nearby New Yorkers, would also miss it. An emergence is “such an amazing natural phenomenon,” said Dr. Bonaros, who has resigned himself to traveling out to Princeton, N.J., to experience this year’s spectacle.

And while other broods are still present on the island, the nationwide wave of insect interest spurred by this one in particular “really brings attention to our charismatic microfauna,” said Dr. Gangloff-Kaufmann. “It is a loss.”

LONG LIVE BROOD X?

In addition to his Princeton trip, Dr. Bonaros will head back to Ronkonkoma this year, “to see if there is any resurfacing of our mysterious and potentially extinct Brood X,” he said. But he’s also adding another stop:

near Brookhaven National Laboratory, one of several places where Brood XIV may make an early appearance.

This brood — declining, but still fairly robust during its last showing in 2008 — is supposed to emerge again in 2025. But Dr. Simon suspects some cicadas from that brood might come up this year instead.

Early and late emergences have always been possible — indeed, it's likely that all of Long Island's cicada broods originally splintered off from Brood XIV in this way, millennia ago. But the longer growing seasons that can trigger them are “happening more often now with climate change,” said Dr. Simon.

Because cicadas are sorted based on the year they emerge, any former Brood XIV cicadas that come up this year will become default members of Brood X. If they do so in large enough populations to persist, it could turn out that Long Island has held onto its share of the famous brood — just in slightly different locations.

She encourages people to search for these as well, and to report back. What looked like an insect swan song could become “a phoenix,” she said. ●

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AFTER 17 YEARS, THE CICADA CHORUSES ARE BACK

Once aboveground, cicadas only have a few weeks to find mates and reproduce—which is why males have evolved an incredible vocal repertoire to attract females.

By Diana Marques and Oscar Santamarina

As Brood X emerges across the eastern U.S., trillions of insects will soon take to the trees, shrilling their mating songs. This group of periodical cicadas, as they're called, makes up three species and spends 17 years underground. In some areas, all species coexist; in others, one prevails.

Brood X cicadas can be distinguished by looking at the underside of the abdomen. The presence of orange stripes and stripe thickness identify both males and females.

Regardless of the species, every short-lived male and female has the same goal: to find a partner and reproduce. This is where sound comes in. Courting males join together in their calls, establishing chorus hot spots that can attract females as far as a mile away.

A chorus of *Magicicada cassini* is different, with bursts of sound followed by rapid clicks. Each species' distinctive calls allow females to recognize and mate with males of their own kind, which leads to viable offspring.

A *Magicicada cassini* chorus calls with bursts of sound followed by rapid clicks. Cicadas' sound apparatus exclusive to males, is made up of two drum-like ribbed membranes, called tymbals. Superfast muscles cause tymbals to buckle inward and release, producing 300 to 400 clicks per second. The sound is amplified by the hollow abdomen that acts as a resonance chamber the way a guitar amplifies string vibrations.

The typical male behavior while perching is to make a few calls, walk or fly a bit, then call again. The sound is altered by the position of the abdomen closer or farther away from the tree.

This intricate mechanism gives males a repertoire of sounds, used in their distinctive chorus, while distressed, or while courting an individual female. Here, a *Magicicada septendecim* male woos a female, who responds with wing flicks, her way of showing interest.

A *Magicicada septendecim* male courts a female nearby. Encouraged by the response, the male increases the frequency of the call in two stages while approaching the female; the sound continues until they mate.

The courtship call becomes more frequent and continues until mating. The female will deposit eggs in tree branches sometime later. The newly born larvae that bury themselves underground are the cicadas we'll be hearing 17 years from now. ●

HOW TULSA MASSACRE SPENT MOST OF LAST CENTURY UNREMEMBERED

By Deepti Hajela

When the smoke cleared in June 1921, the toll from the massacre in Tulsa, Oklahoma, was catastrophic — scores of lives lost, homes and businesses burned to the ground, a thriving Black community gutted by a white mob.

The nightmare cried out for attention, as something to be investigated and memorialized, with speeches and statues and anniversary commemorations.

But the horror and violence visited upon Tulsa's Black community didn't become part of the American story. Instead, it was pushed down, unremembered and untaught until efforts decades later started bringing it into the light. And even this year, with the 100th anniversary of the massacre being recognized, it's still an unfamiliar history to many — something historians say has broader repercussions.

"The consequences of that is a sort of a lie that we tell ourselves collectively about who we are as a society, who we have been historically, that's set some of these things up as aberrations, as exceptions of what we understand society to be rather than endemic or intrinsic parts of American history," said Joshua Guild, an associate professor of history and African American studies at Princeton University.

Indeed, U.S. history is filled with dark events — often involving racism and racial violence — that haven't been made part of the national fabric. Many involved Black Americans, of which the Tulsa Race Massacre is considered among the most egregious in its absolute destruction, but other racial and ethnic communities have been impacted as well.

Americans not knowing about these events or not recognizing the full scope of the country's conflict-ridden history has impacts that continue to reverberate, Guild said.

"If we don't understand the nature of the harm ... we can't really have a full reckoning with the possibility of any kind of redress," he said.

Manisha Sinha, a professor of American history at the University of Connecticut, agreed.

"It's really important for Americans to learn from the past, because you really cannot even understand some of our current-day political divisions and ideas unless you realize that this conversation over both the nature and the parameters of American democracy is an ongoing and a really long one," she said.

Terrible events that many Americans don't know about include long-ago history, such as the Snake River attack in Oregon in 1887, where as many as 34 Chinese gold miners were killed, and the 1864 Sand Creek massacre of around 230 Cheyenne and Arapaho people by U.S. soldiers in Colorado. Others are within the lifetimes of many Americans living today, like the 1985 bombing by Philadelphia police of the house that headquartered the Black organization MOVE, killing 11 people.

As odd as it may sound, the mere fact that something happened isn't enough for it to be remembered, said Robin Wagner-Pacifi, a professor teaching sociology at the New School for Social Research, who has written about the MOVE bombing.

"You can never assume, no matter how huge an event may be in terms of its literal impact on numbers of people, that it's going to be framed and recognized and move forward in time, in memory, by future publics or state apparatuses or political forces," she said.

In Oklahoma, the massacre largely wasn't discussed until a commission was formed in 1997 to investigate the violence. For decades, the state's public schools called it the Tulsa race riot, when it was discussed at all. Students now are urged to consider the differences between calling it a "massacre" or a "riot."

How an event is presented can make a difference, Wagner-Pacifi said. That could include whether it's connected to other historical moments and what parts are emphasized or downplayed.

"All sorts of political forces and actors will kind of move in, to try to name it and claim it, in order either to tamp it down in its impact or to elaborate it in its impact," she said.

She pointed to a current example: the deadly Jan. 6 insurrection by a predominantly white mob at the U.S. Capitol. Some Republicans have attempted to minimize or even deny the violence, and on Friday GOP senators blocked the creation of a bipartisan panel to investigate the attack.

In Tulsa, word of unrest that started on May 31, 1921, and ran through the night and the next day made it to news outlets. Front-page stories and accounts from The Associated Press spoke of a “race clash” and “armed conflict.” But the aftermath — of a community shattered — was relegated to inside pages at best before being swept under the rug.

In one example, a story weeks later well inside the pages of The New York Times reported in passing that a grand jury in Oklahoma had determined the catastrophe was due to the actions of armed Black people and the white people who got involved were not at fault.

It just shows that remembering is never just actually about remembering, Wagner-Pacifici said.

“It’s always motivated,” she said. “Who remembers what about the past, who allows a past to be remembered, to be brought back to life and and in what ways ... it’s absolutely fundamental to who you decide you want to be in the present.” ●

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CONNECTICUT HAS SPENT \$10M ON COVID MESSAGING. IS IT WORKING?

By Jordan Fenster

The first anti-vaccine message of the coronavirus pandemic was posted on Facebook months before there were any concrete plans for a vaccine.

“It was February of 2020,” said Seth Kalichman, a professor in psychological sciences at the University of

Connecticut. “Operation Warp Speed, I think, was officially announced in April, if I’m not mistaken.”

Anti-COVID vaccine messages were being promulgated on Facebook before anyone had even heard of the coronavirus.

“No one was calling it COVID. It wasn’t named yet, when they were talking about it,” Kalichman said. “Their first post called it ‘this new virus in China,’ the ‘China virus,’ and the ‘new SARS.’”

CORONAVIRUS IN CONNECTICUT

Since then, vaccines to fight COVID have been developed, approved and distributed to millions of people nationwide though, behind the scenes, a war of words and ideas have raged.

“There’s no doubt that there is a messaging battle going on,” said Max Reiss, a spokesperson for Gov. Ned Lamont’s administration.

Which side is winning that battle is a matter of opinion. Pointing to high vaccine rates in Connecticut, Reiss said, “the right side of the debate is winning.”

Kalichman, though, said agencies like the Centers for Disease Control and Prevention have “failed to accurately and convincingly and coherently provide public health messaging.”

He and his UConn colleague, Lisa Eaton, had been studying health messaging around HIV. When the coronavirus pandemic struck, like so many other researchers, they shifted their focus, attempting to determine the earliest origins of the anti-COVID vaccine movement on Facebook.

Kalichman and Eaton believe the anti-vaccine machine has been more effective than vaccine supporters.

“They are being beat. There is no question that they’re being beat at their own game, and it’s not just the anti-vax groups,” Kalichman said. “It filters beyond them into media and into social networks, people’s lives. That information just moves very differently than evidence-based, science-based information.”

TIMING MAY BE EVERYTHING

The state of Connecticut has budgeted \$11 million for communications during the pandemic, which includes

development of the COVID Alert CT phone application and contact tracing efforts, among more traditional communication efforts like advertisements.

“As of now, roughly \$10 million has been spent, total,” Reiss said, approximating that \$2 million has been spent since January, when the first vaccines were distributed in the state.

For context, Reiss said the state’s “entire tourism campaign this year is \$1.2 million,” calling the \$11 million COVID communications budget “an investment that Connecticut has never made before at this level.”

The state published its first pro-vaccine messaging in December 2020 — 10 months after Kalichman and Eaton say the first anti-vaccine messages were posted on Facebook.

The problem, experts say, is that pro-vaccine messages rely on science. They are nuanced and careful, intellectually honest and deliberately worded.

Anti-vaccination messages rely on pure emotion, confirming fears and anxieties about government overreach, about corrupt politicians or greedy pharmaceutical companies.

“They don't have any rules, and they don't have to worry about credibility,” Eaton said. “So that's a huge step up.”

Those fears are distilled into social media posts by anti-vaccination-focused groups, which are then shared far and wide, taking on lives of their own.

“They have, like, this propaganda machine,” Kalichman said. “Now, who does that influence, who does it impact? We don't really know.”

You might not believe your uncle when he argues there are microchips in every vaccine dose, but his argument is difficult to refute. But timing, Eaton and Kalichman say, is the key to fighting anti-vaccine messages.

Like a vaccine inoculates a patient before they contract that disease, so must pro-vaccine messaging pave the way for any misinformation that might derail vaccination efforts, Eaton said.

“The solution is a vaccine, a social vaccine, it's to inoculate people against these beliefs before the vaccine conspiracy advocates do,” Eaton said. “If you can get ahead of the messaging, you can actually

socially inoculate people from these malignant messages about health care.”

‘HEARTS AND MINDS’

When asked about vaccine messaging, Yale New Haven Health’s chief policy and communications officer, Vin Petrini, quoted Mark Twain: “A lie can travel halfway around the world, while the truth is still tying its shoes.”

In a way, anti-vaccine proponents are waging a guerrilla war. The use of social media is asynchronous, using emotion and shock value. In that way, a small group of people can have an outsized effect.

“It's been estimated that of anti-vaccine social media, 12 people are putting out 90 percent of the material, said Sten Vermund, dean of the Yale School of Public Health. “And those 12 people get packaged and repackaged and repackaged.”

Those posts consist of certain themes that have proven effective and so are regurgitated over and over.

“They have the same content, they have the same themes,” Kalichman said. “Anti-government, mistrust of public health authorities, concerns about side effects and the overwhelmingly better option of natural immunity.”

There is also the idea that the vaccines were produced too quickly for them to be safe, according to Eaton.

“There's a little bit of a fallacy around believing that just because something's fast means that it's inferior,” she said. “That's something new that came with the COVID vaccine, you hear a lot of people say that.”

According to Vermund, the way to combat that tactic is on the ground, where people live, through the mouths of people they trust.

“We in the public health field need to be more strategic and more effective in the public communication narratives,” Vermund said. “We also need to touch hearts, and not just minds. We also need to influence people through influencers.”

Vermund pointed to a video posted by Dolly Parton. She was vaccinated publicly, and sang an altered version of her iconic song, “Jolene.”

“That's what we need in spades,” Vermund said. “At the end of the day, I think that's the kind of thing that we need much more of.”

It's not just Dolly Parton. Morgan Freeman has appeared in a public service announcement, and though he didn't get vaccinated publicly, a short piece about former President Donald Trump that appeared on FOX News has been repurposed as a pro-vaccination message.

“If it's conspiracy theorists, Donald Trump has to be the spokesperson in favor of vaccines,” Vermund said. “If it's religiously motivated opposition, religious leaders have to be the spokespersons. If it is political opponents like Rand Paul-types, sort of libertarian, don't tread on me, don't tell me what to do, then it's going to have to be advocates for libertarianism.”

‘THE 10 PERCENT RULE’

Imagine three groups of people. First, you have those who are willing or even excited to be vaccinated. On the other side of the spectrum, you have people who are not able to be persuaded, who will never get a vaccine.

In the middle, you have the battleground.

“It's ‘persuading the persuadable,’ as we like to say,” Petrini said. “We used to use the 10 percent rule: 10 percent that will do it no matter what, there's 10 percent that won't do it no matter what, and there's that 80 percent middle, generally speaking, that we really need to speak to.”

For some, there are historical concerns, which Eaton said she understands.

“Some of our participants can talk about medical abuse, the legacy of medical abuse in our society,” she said. “That is something to be talked through. And I do think for some people, there is sincerely a fear for their children, like they do feel fear in saying, ‘Yes, you can vaccinate my child.’”

Some people will respond to science-based discussion on the myths. Others might respond to appeals to one's sense of civic responsibility or personal responsibility. Some might respond to the idea that they are protecting their friends and family from ruin. For each of those objections, there are different responses.

“There's probably hundreds of reasons why people are hesitant to get the vaccine,” Petrini said.

But Vermund said there's a difference between hesitancy and opposition.

“It's important not to conflate those because hesitancy tends to be people who are not against vaccines, they just are not keen to be front in line for a new vaccine that doesn't have full FDA approval yet,” he said. “That group is shrinking every single month into the vaccinated group.”

“That's a very different challenge than the vaccine oppositional group, which has a cadre of religious opposition, political opposition, conspiracy theory-ism,” Vermund said, calling them “tough nuts to crack.”

Vermund is fully aware that hearing a message from the dean of the Yale School of Public Health will likely have the opposite effect.

“That's not going to impress the conspiracy theorist,” he said. “Just the fact that I say it will confirm that they're right.”

What matters more than anything, he said, is whose voice is speaking the message. Trump did not release a pro-vaccine PSA, but it would have been more effective if he had.

“That would be a lot more influential than the rest of us making one of these things and just putting it out there because it's easy to overlook it when it's not the big boy speaking for himself,” Vermund said. “Dolly Parton, I think, was responsible for getting a lot of people vaccinated. I think a lot of people in her constituency saw that video, which was widely circulated. And that's why Tennessee and Alabama rates are not even worse.”

That strategy is also effective on a local level within Connecticut.

“What's been particularly effective is partnering with community organizations, and places like churches, and groups that have embedded credibility with audiences,” Petrini said. “So you can talk to an organization that will then, by its presence, endorse the strength of that message.” ●

TO STUDY SWARMING CICADAS, IT TAKES A CROWD

Cellphone wielding observers track when and where the insects emerge

By Ian Graber-Stiehl

The billions of periodical cicadas now crawling, fluttering, and singing from trees in the eastern United States have roused a throng of humans as well, who are mapping the insects and timing their emergence in what may be the country's longest public science tradition. Using a free app called Cicada Safari, more than 150,000 people so far have uploaded geotagged photos of cicadas, helping scientists track their emergence after 13 to 17 years underground.

The insects are an ideal target for science-inclined amateurs—unmissable and mysterious at the same time. "We just don't know what's going on in their life" underground, says Douglas Pfeiffer, an entomologist at Virginia Polytechnic Institute and State University. With just a handful of scientists trying to understand a natural event both massive and rare, aid from amateur scientists is invaluable. In recent years, community reports have caught the formation of new populations, helped study the link between emergence and air temperature, and traced how cicada populations respond to stressors.

Periodical cicadas are grouped into 15 broods based on where and in which years they emerge. Eggs laid in tree branches hatch, and the nymphs fall and burrow into the ground. There, they feed on xylem from tree roots, molting four times over the next 13 or 17 years, before emerging when the ground temperature reaches roughly 17.7°C. Then the frenzy of calling and mating begins.

The public can use the Cicada Safari app, released in 2019 by Gene Kritsky, an entomologist at Mount St. Joseph University, to send photos to researchers, who review the genus, location, and brood identity of paparazzied cicadas. Last year, the abundance of data

points revealed something unexpected: The first reports of cicadas in 2020 weren't from the expected Brood IX, which mostly lives in Virginia, West Virginia, and North Carolina. Instead, cicadas were emerging "from Georgia, then South Carolina, then Alabama and Missouri," Kritsky says—areas where an emergence wasn't expected for another 4 years. "We were seeing what turned out to be a 4-year acceleration of a 13-year cicada emerging after 9 years."

Only once, Kritsky says, have scientists observed a large group of stragglers successfully splinter off from their brood. A group of Brood X cicadas (the same enormous brood currently serenading much of the East Coast), known to dominate the area around Cincinnati, emerged there in 2000, 4 years early. The cicadas came out in such force that their numbers overwhelmed predators, leaving them to survive and mate. Then, 17 years later the group emerged for a second time, having spread in geographic range, and likely formed a new brood.

Last year, Cicada Safari data showed that not one, but four broods of periodical cicadas emerged off-cycle. Stragglers, which can emerge years before or after their brood, aren't uncommon. But the scale of their 2020 emergence was. Kritsky says last year's stragglers may have given rise to an entirely new periodical population.

Without the public, the full scope of last year's straggler event would likely have been missed. It was far from the beginning of cicada citizen science. In 1843, Gideon Smith, a medical doctor and silkworm cultivator in Baltimore, convinced newspapers to publish his appeals to readers to report emergences of cicadas, which were called locusts at the time. Smith claimed to have ascertained "eighteen districts or families of locusts. If each post master in places where locusts appear will drop me a line ... I shall be able to make out a map of each district." The ensuing mail campaign, arguably the nation's first large-scale community science, "was quite successful," says Kritsky, who wrote about Smith in December 2020 in *American Entomologist*.

"By time [Smith] died, in 1867, he had documented all the known broods of periodical cicadas," Kritsky says.

Another entomologist, U.S. Department of Agriculture (USDA) researcher Charles Marlatt, used a mail-campaign initiative to map periodical cicada distribution in greater detail. In 1902, Marlatt spearheaded a USDA

campaign to send out more than 15,000 postcards soliciting reports of cicadas. The 1000 responses helped him delineate cicada broods by emergence year.

Later, mailed and phoned-in cicada reports went to universities across the country. But the data varied widely in quality and focus, says Chris Simon, an ecologist and biologist at the University of Connecticut, Storrs. She once received a marriage proposal in the mail instead of data.

Kritsky's app took cicada reporting online. And more people than ever are taking part during the pandemic: Between 2019 and 2020, Cicada Safari's user base grew by nearly 50%, to 10,000 contributors. This year, with the emergence of the massive Brood X, the app has leapt to 156,000 users.

In 2020, the team added the ability to upload 11-second videos. Although Kritsky and his colleagues have seen many videos of children chasing cicadas, clips of chorusing cicadas have also allowed the researchers to verify the presence of mating populations rather than one-off sightings.

Last year also marked the first scientific paper based on Cicada Safari data. Published by Michael Raupp, an entomologist at the University of Maryland, College Park, Kritsky, and colleagues in *The Maryland Entomologist* in September 2020, it cross-referenced air temperature with nymph emergences reported through the app. The aim: to improve predictions of cicada emergences using air temperatures, which are far more available than soil temperatures. With a small sample size, the results were inconclusive. Nevertheless, the paper marked another first: using cicada community science to answer nuanced questions, rather than simply reporting distribution and emergence dates.

Raupp thinks data from the public could help address enigmas that still surround cicadas, such as why stragglers break off from broods. One idea: Warm winters may cause cicadas to emerge in the wrong year. Detailed data on weather and emergence patterns might support that idea—or a different hypothesis about why some cicadas miscount the passing years. (In a further mystery, stragglers tend to miscount by specific amounts, either 1 or 4 years.)

Without understanding the factors influencing emergence, it will be hard to protect cicadas from threats that include pesticides, development, and

climate change. Raupp says development may have done in Brood XI, a 17-year cicada population in Connecticut last observed in 1954. And this year's group, Brood X, has been in decline on Long Island in New York for nearly 200 years. Cicada Safari reports should help, Raupp says, because researchers can cross-reference them with local records of land use and climate.

Michelle Watson, a retired paralegal who has submitted more photos to Cicada Safari than anyone else, says she has grown addicted to contributing to the community of cicada enthusiasts. Watson, who recently moved to Blue Ridge, Georgia, had never seen periodical cicadas before this year. While looking online for information about whether they were safe for her dogs to eat, she found Cicada Safari.

Even after this year's cicadas disappear once more, Watson says the passion they've sparked for science projects will likely stick around—for her, and tens of thousands of others as well. ●

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CONNECTICUT OFFERS \$1,000 HIRING BONUS FOR LONG-TERM UNEMPLOYED

The state hopes to entice people who have been on unemployment for 12 weeks or longer to rejoin the workforce

By Joseph De Avila

As states across the U.S. try to figure out ways to bring people back into the workforce, Connecticut Gov. Ned Lamont is betting on government-funded hiring bonuses to motivate workers to find a job.

The Lamont administration's program will give \$1,000 to people who have been on long-term unemployment after they get a job and hold that position for at least eight weeks. The program will give bonuses to 10,000

people and will be paid for using federal funds from the CARES Act, which was approved by Congress last year.

The bonus program launched in mid-May, and so far nearly 500 people have applied for the payment.

“We thought this would be an easy way to transition off of unemployment and move back into the working world,” said Mark Boughton, commissioner of the Connecticut Department of Revenue Services, which is overseeing the bonus program.

Connecticut’s approach, put in place by a Democratic governor, stands in contrast to other efforts in Republican-led states like Tennessee, South Carolina and Mississippi, where officials there have opted out of enhanced federal Covid-19 pandemic unemployment payments. Officials there say the additional weekly cash payment of \$300—on top of normal unemployment benefits—is discouraging people from finding work and creating worker shortages.

Steven Lanza, associate professor in residence at the University of Connecticut in the department of economics, said the different approaches from Republican and Democratic governors can be viewed as a real-time experiment.

“It’s a test of whose theory is right here,” Mr. Lanza said.

Mr. Lanza said he gives Mr. Lamont credit for a creative attempt to get people back in the workforce, but noted that 10,000 jobs is only a fraction of the 115,700 positions the state still needs to recover to get back to pre-pandemic levels.

Connecticut’s economy has struggled even before the pandemic. The state was still working on recovering all the jobs it lost from the 2007-2009 recession when the pandemic hit and widespread business closures wiped out 292,400 jobs.

Now job openings are on the rise in Connecticut as the state rolls back many of the business restrictions that were put in place during the pandemic to stop the spread of Covid-19. There were nearly 8,000 new job openings in Connecticut for the week that ended May 22, up 17% from four weeks prior, according to the Connecticut Labor Department. Retail and accommodation and food services were among the industries posting the most new openings.

Some GOP-led states like Arizona are using a carrot-and-stick approach. Arizona opted out of the supplemental unemployment program and also launched its own hiring-bonus program where people can get payments of \$2,000 for finding full-time work. Other states offering bonuses include New Hampshire, Colorado and Oklahoma.

Mr. Boughton said the Lamont administration chose to continue accepting the supplemental unemployment payments, scheduled to end in September, because some people need more time to transition back to work.

“I definitely understand why some states are deciding to eliminate supplemental unemployment benefits,” Mr. Boughton said. “But I think that’s a little heavy-handed, and I think this way gives people a transition to jump off of one program onto another.”

State Senate Republican Leader Kevin Kelly said Connecticut should have opted out of the enhanced unemployment program. Resorting to using hiring bonuses is indicative of Connecticut’s broader economic troubles, he said.

“I don’t believe that this is good policy or a good use of state resources,” Mr. Kelly said.

Don Klepper-Smith, chief economist at research firm DataCore Partners, called the bonus program a “Band-Aid solution” for a state that has struggled economically for more than a decade.

“I think you need to put money in workforce development” rather than hiring bonuses, Mr. Klepper-Smith said.

Connecticut also recently reinstated the requirement that people collecting jobless benefits must also search for work while they are on unemployment. The work-search requirements were waived earlier in the pandemic when jobs were scarce.

Eric Gjede, vice president of government affairs with the Connecticut Business and Industry Association, said reinstating the work-search requirements will probably be more successful at getting people back into the workforce than the bonus program.

But “if all 10,000 applications have been filled, that will be great news,” Mr. Gjede said. ●

IMMUNE CELLS ARE MORE PARANOID THAN WE THOUGHT

Healthy birds watched their friends get sick with a bacterial disease. Their immune cells freaked out.

By Katherine J. Wu

The best immune systems thrive on a healthy dose of paranoia. The instant that defensive cells spot something unfamiliar in their midst—be it a living microbe or a harmless mote of schmutz—they will whip themselves into a frenzy, detonating microscopic bombs, sparking bouts of inflammation, even engaging in some casual cannibalism until they are certain that the threat has passed. This system is built on alarmism, but it very often pays off: Most of our encounters with pathogens end before we ever notice them.

The agents of immunity are so risk-averse that even the dread of facing off with a pathogen can sometimes prompt them to gird their little loins. Ashley Love, a biologist at the University of Connecticut, has seen this happen in birds. A few years ago, she stationed healthy canaries within eyeshot of sick ones, infected with a bacterium that left the birds sluggish and visibly unwell. The healthy canaries weren't close enough to catch the infection themselves. But the mere sight of their symptomatic peers revved up their immune systems all the same, Love and her colleagues report today in *Biology Letters*.

Love, who did the research as a graduate student at Oklahoma State University, had an inkling that the experiment would work before she did it. In 2010, the psychologist Mark Schaller, at the University of British Columbia, and his colleagues described a similar reaction in humans looking through photos of people who were sneezing or covered in rashes.

The study subjects' immune cells then reacted aggressively when exposed to bits of bacteria, a hint that the pictures had somehow whipped the body into fighting form, Schaller told me.

That 2010 study, Love told me, "Sort of blew my mind," because it didn't follow the typical trajectory of the immune system reacting to an ongoing assault. Instead, the cells were internalizing visual cues and buttressing themselves preemptively—raising shields against an attack that hadn't yet happened, and perhaps never would. It was what you might call bystander immunity, and it was totally bizarre.

Love decided to try her own version in domestic canaries, among the many bird species susceptible to a pathogen called *Mycoplasma gallisepticum*. She infected 10 canaries with *Mycoplasma*, then placed them in sight of microbe-free birds. In parallel, she had two other cadres of healthy canaries scope each other out, as a symptomless point of comparison.

Throughout the 24-day experiment, the uninfected canaries acted as most songbirds do, feeding, chirping, and bopping cheerily around their cages. But about a week in, the birds dosed with *Mycoplasma* became mopey and lethargic, and developed a nasty form of pink eye. "I could approach the cage and just pick them up," Love told me. (Some *Mycoplasma* species can cause disease in humans; this one doesn't.)

The birds watching their beleaguered peers never got infected themselves. But when Love and her colleagues examined the canaries' blood, they found that some of the birds' immune responses had swelled in near lockstep with the sick birds' symptoms. Cells called heterophils—inflammation-promoting foot soldiers that fight on the front lines of many avian infections—had flooded the bloodstream, similar to how they would in the presence of *Mycoplasma*, Love said. The birds' blood was also rife with so-called complement molecules, which can shred bacterial cells, or flag them for other types of destruction.

The uptick was temporary. As the symptoms of the sickened birds abated, their observers' immune cells quieted down as well. Love told me she suspects that these little flare-ups might have primed the watchful birds for a possible tussle with the pathogen—perhaps cloaking them in a light layer of armor, akin to a very crude and very ephemeral vaccine.

To confirm that idea, Love would have needed to expose the onlooker birds to *Mycoplasma* while their immune systems were still raring to go, an experiment she is working on now. Without those data, "it's hard to

know what this means,” Jesyca Meléndez Rosa, an immunologist at Humboldt State University who wasn’t involved in the study, told me.

The immunological surge did seem driven by the disease cues that the other birds emitted, because samples taken from the canaries who’d peeped on only healthy birds stayed comparatively inert. But what the researchers found could have just been a blip—noticeable, yet not strong enough to alter the trajectory of a subsequent infection. A bystander immune response could even be a net negative for the witness, wasting precious bodily resources or unnecessarily damaging healthy tissues. Heterophils and complement molecules also comprise just a small subset of the immune system’s arsenal, much more of which would be marshaled into quelling a *Mycoplasma* invasion. Leticia Soares, a disease ecologist at Western University who wasn’t involved in the study, told me she wished she’d been able to see how well the observer birds’ immune responses simulate what happens in infected birds who eventually recover.

Still, the potential payoff is “huge,” Meléndez Rosa said. A well-timed burst of immune activity, especially one kick-started in advance, could theoretically help the birds thwart illness and death, or maybe even stave off infection entirely. Birds are also “highly visual” animals, Soares told me, capable of tuning in to even slight changes in appearance. That intel could then spark a body-wide stress response, like a security camera tripping alarms throughout a well-protected building. “The idea of that is fascinating,” Soares said.

The connective tissue that links visual cues to immune activation is still scientifically foggy. At first, “it all seems kind of magical,” Schaller, the University of British Columbia psychologist, told me. But it’s also sensible (literally) for animals to glean information from their environment and react accordingly.

“We’re stimulus-response devices,” he said. “We perceive something in some way, and our body responds.”

Several experts told me that they wouldn’t be surprised if nonvisual signals—including the sounds, sensations, or even smells of a stranger’s sickness—could clue animals into the risks of infection as well.

Love told me she hopes to figure out whether animals can tune their immune responses to the severity of the disease symptoms they see.

The paper speaks to the strange appeal of visible disease, says Cécile Sarabian, an expert in sickness behaviors at the Kyoto University Primate Research Institute who wasn’t involved in the study. The signs and symptoms of infection are often a pain for the individual who experiences them. But they also “alert others, and prepare other potential hosts,” she told me.

Spotting symptoms alone isn’t good enough. In the past year and a half, SARS-CoV-2 has benefited from its ability to spread silently from person to person.

Humans have also taken a multitude of other measures—masking, distancing, and the like—to keep the coronavirus at bay, acts of avoidance that Schaller says count as a kind of behavioral immunity.

Still, Schaller and others think it’s interesting to consider what sorts of infections count as truly “asymptomatic.” Even if an infected person isn’t feeling outright ill, they might be beaming out slight signals that betray their status, and influencing those around them.

“We’re pretty sensitive to some pretty subtle stuff,” Schaller said. “It could be that we are able to pick up on other people’s sicknesses, even if those people are not yet aware.”

If an infection is to persist in a population long term, it must become communal; perhaps the experience of it is as well, in ways we don’t yet appreciate.

Soares, who’s had long COVID for more than a year, told me that we urgently need to understand “how this societal crisis will affect our health in general.”

This pandemic, and many that have come before it, is a reminder of what researchers are now starting to systematically define: Even those who aren’t directly touched by a pathogen can still feel its effects. ●

THE MERE SIGHT OF ILLNESS MAY KICK-START A CANARY'S IMMUNE SYSTEM

Simply seeing another bird get sick is enough to trigger an immune response in healthy birds

By Jonathan Lambert

For canaries, just seeing their feathered friends get sick may be enough to preemptively rev up their immune systems.

Healthy birds housed within view of fellow fowl infected with a common pathogen mounted an immune response, despite not being infected themselves, researchers report online June 9 in *Biology Letters*.

"It's fascinating that some sort of visual cue could alter immune function," says Ashley Love, a disease ecologist at the University of Connecticut in Storrs. Precisely how much these alterations actually protect the birds remains unclear, she says.

Immune systems are like sentinels, patrolling the body for invaders and calling in the cavalry once a pathogen is detected. Traditionally, pathogens have to actually get into bodies to spur that sort of response.

But some research has previously hinted that perceived threats can whip up immune cells. For example, one experiment in humans found that a mere photo of a sick person increases the activity of inflammation-stimulating chemicals called cytokines. But no one had ever looked to see whether being within eyeshot of an actually sick individual could compel the immune system to preemptive action, Love says.

"A lot of wildlife diseases have these obvious physical symptoms," she says. If wild animals can prepare, immunologically, at the first sign they might become infected, they may be better equipped to fight off the invader once it comes.

To test this idea, Love and her colleagues infected 10 caged canaries (*Serinus canaria domestica*) with

Mycoplasma gallisepticum, or MG, a common bacterial pathogen that causes conjunctivitis and extreme lethargy. Sick birds look "pretty fluffed out," Love says.

Nine healthy birds were housed in direct view of their sick brethren, but far enough away to avoid infection, which requires direct contact. An identical setup, but with all healthy birds, was located in the same room but on the other side of an opaque divider. Over the course of a month, researchers collected blood samples from the birds, measured various aspects of immune activity and tracked how sick the infected birds looked.

As healthy birds witnessed neighbors becoming visibly sick, their immune systems stirred. A measure of the birds' ability to burst foreign cells, called CH50 complement activity, rose in conjunction with how sick the infected birds appeared. White blood cell counts were also significantly different in birds exposed to sick individuals, rather than healthy ones. Cytokine levels did not differ between the two groups.

Blood tests showed that no healthy birds caught MG during the experiment, suggesting that some sort of external cue altered immune function. That cue was likely visual, Love says. The smells and sounds of the sick could reach all birds in the experiment, but only the birds in direct view of the ill birds showed an immune response.

"This was a pretty convincing study," says Dana Hawley, a disease ecologist at Virginia Tech in Blacksburg who wasn't involved in the research. Lots of animals avoid infection by social distancing, she says. For instance, lobsters steer clear of dens occupied by sick individuals, and the house finches that Hawley studies avoid individuals who appear ill.

But social distancing has its costs, especially for highly social species.

For species that forage together, or rely on safety in numbers, ramping up an immune response at the mere sight of illness might confer some protection while still allowing the animals to get up close and personal.

"It's great to avoid a pathogen," Hawley says, "but if you can't find food or [you] get taken by a predator, it doesn't really matter." ●

LEGISLATORS, STUDENTS PUSH FOR K-12 ASIAN AMERICAN STUDIES

By Annie Ma

When the Asian American Student Union at a Connecticut high school organized a Zoom call following the killing of six Asian women in Atlanta, senior Lily Feng thought maybe 10 or 15 classmates would attend. When she logged on, more than 50 people from her school were online. By the call's end, nearly 100 people had joined.

Seeing her peers at Farmington High School turn out for the conversation — one piece of a student-led effort to explore Asian American identity issues — made her realize how much they wanted to listen and learn about a topic that is often absent from the curriculum.

“Our Asian American and Pacific Islander community members, they want their voices to be heard,” said Feng, co-president of the student group that also has brought in speakers, hosted panels and created lessons about Asian American history. “They are almost desperate to be speaking about it. This is so heavy, this is heartbreaking and it was a space for them to really voice that.”

As students push for more inclusive curriculum, some lawmakers, educators and students themselves are working to address gaps in instruction and fight harmful stereotypes by pushing for more Asian American history to be included in K-12 lesson plans.

Illinois would become the first state to require public schools to teach Asian American studies if the governor signs a bill that cleared the state Legislature. Lawmakers have proposed similar mandates this year in Connecticut, New York and Wisconsin.

Jennifer Gong-Gershowitz, an Illinois representative, said she sponsored the bill in response to the increasing anti-Asian violence and rhetoric. Growing up, she said she knew little of the discrimination her family had faced in earlier generations because it wasn't taught in school and her family did not openly speak about it.

“I think, like a lot of Asian families, their response to that discrimination was to endure, to survive,” she said. “And that meant moving past it, not talking about it, not educating the next generation about the struggles faced by a first generation.”

It wasn't until law school that Gong-Gershowitz learned about the Chinese Exclusion Act, an 1882 law that prohibited Chinese workers from immigrating and the only law to exclude a specific ethnicity from entering the country, and the deportation threat it represented for her grandparents. Understanding that history is central to addressing the violence today, she said.

“When people talk about what are we going to do about racism, hate, violence, otherization, my answer is always look at the root cause of that,” she said. “Empathy comes from understanding, and we cannot do better unless we know better.”

On the federal level, U.S. Rep. Grace Meng, D-N.Y., has reintroduced legislation intended to promote teaching Asian American history. The bill would require Presidential and Congressional Academies, which offer history and civics programming to students and teachers, to include Asian American history in their grant applications. It would also encourage state and national assessment tests to include Asian American history.

Asian Americans are largely excluded from textbooks, shown as stereotypes or framed as model minorities, said Nicholas Hartlep, an associate professor at Berea College in Kentucky who authored a book on those depictions in instructional materials. He said it is encouraging to see the legislation, but funding to support the requirements is necessary for them to make a difference.

“Is that an unfunded mandate where they just say, ‘Yes, it has to be covered?’” Hartlep said. “Or does it come with funding? And what quality assurances do we have for what's being taught? Because if it's just glossing over, that can be equally damaging.”

The growing conversations around anti-Asian hate have also given new urgency to long-running efforts to develop and introduce instructional material for schools that explores Asian American history.

Some educators have taken it upon themselves to fill the content gap.

As public school teachers earlier in their careers, Freda Lin and Cath Goulding each saw little of their personal history reflected in the lessons they were teaching unless they designed their own. Now, as co-directors of YURI Education Project, they provide curriculum and professional development around teaching Asian American history.

Goulding said that while the push for inclusion dates back to the 1960s, recent advocacy to expand Asian American and ethnic studies, including Black, Latino and Native American history, in K-12 classrooms has tried to go beyond representation to look at how race shapes power structures and lived experiences.

“When I was becoming a teacher in the early 2000s, the trend in education then was multiculturalism,” Goulding said. “At its core, it was not about critiquing power and for me that’s been the real shift in the conversations.”

At its best, ethnic studies helps students understand their own agency and teaches children to draw connections between historic events like the Chinese Exclusion Act and modern-day immigration issues, said Jason Oliver Chang, a professor at the University of Connecticut who has worked to advance the state’s legislation on Asian American studies.

“I think ethnic studies is in some ways a way of practicing citizenship,” Chang said. “Learning about ourselves, but then also acting on that knowledge. It’s about teaching in a way that engages the student and their own story and perspective, with content that engages with the structures of power that shape their world.”

Students at Farmington High School are pushing those lessons forward on their own. This year, the Asian American Student Union’s leaders met with the school administration to propose changes to the social studies curriculum.

Mingda Sun, a member of the organization, recalls being taunted by racist slurs from her peers in elementary and middle school. Back then, she said, she was too young to fully understand the racism that fed the bullying, and her experiences were rarely acknowledged at school.

She hopes the advocacy that has followed this year of violence can change that in the future, starting with her own school and state.

“At the end of the day it’s about empowering young Asian Americans to feel proud of who they are,” she said. “It’s about helping schools that are able to provide resources and opportunities to do that.” ●

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UCONN RECEIVES \$40M NATIONAL RESEARCH GRANT, LARGEST EVER, TO STUDY MOLECULES AND HELP IDENTIFY DISEASES

By Amanda Blanco

UConn is receiving a \$40 million research grant from the U.S. National Science Foundation, the largest in the school’s history, the university announced Wednesday.

The funds will be used to establish a “Network for Advanced NMR,” or NAN, based out of UConn’s medical school in collaboration with the University of Georgia and the University of Wisconsin. NMR, or nuclear magnetic resonance, is “a powerful method for analyzing molecules,” the university said.

The announcement follows recent news of university President Thomas Katsouleas’ plans to step down at the end of June. During his time in office, Katsouleas pushed strongly for UConn to double research spending to \$500 million over the next decade.

The group, led by UConn molecular biology and biophysics Professor Jeffrey Hoch, is expected to progress national molecular research in the fields of chemistry, materials science and bioscience. Hoch also serves as the director of UConn’s Gregory P. Mullen NMR Structural Biology Facility.

“Our biggest hope is that NAN and advanced NMR technology’s expanded use will accelerate the identification of future disease biomarkers and ultimately improve the health and outcomes of patients everywhere, through future advances in diagnostics,

drug discovery, treatments and especially much-needed cures,” Hoch said, in a statement.

A key priority of the network is increasing researchers’ access to technological resources and data. ●

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SMELLING IN STEREO – THE REAL REASON SNAKES HAVE FLICKING, FORKED TONGUES

By Kurt Schwenk

As dinosaurs lumbered through the humid cycad forests of ancient South America 180 million years ago, primeval lizards scurried, unnoticed, beneath their feet. Perhaps to avoid being trampled by their giant kin, some of these early lizards sought refuge underground.

Here they evolved long, slender bodies and reduced limbs to negotiate the narrow nooks and crevices beneath the surface. Without light, their vision faded, but to take its place, an especially acute sense of smell evolved.

It was during this period that these proto-snakes evolved one of their most iconic traits – a long, flicking, forked tongue. These reptiles eventually returned to the surface, but it wasn’t until the extinction of dinosaurs many millions of years later that they diversified into myriad types of modern snakes.

As an evolutionary biologist, I am fascinated by these bizarre tongues – and the role they have played in snakes’ success.

A PUZZLE FOR THE AGES

Snake tongues are so peculiar they have fascinated naturalists for centuries. Aristotle believed the forked tips provided snakes a “twofold pleasure” from taste – a view mirrored centuries later by French naturalist Bernard Germain de Lacépède, who suggested the twin tips could adhere more closely to “the tasty body” of the soon-to-be snack.

A 17th-century astronomer and naturalist, Giovanni Battista Hodierna, thought snakes used their tongues for “picking the dirt out of their noses ... since they are always grovelling on the ground.” Others contended the tongue captured flies “with wonderful nimbleness ... betwixt the forks,” or gathered air for sustenance.

One of the most persistent beliefs has been that the darting tongue is a venomous stinger, a misconception perpetuated by Shakespeare with his many references to “stinging” serpents and adders, “Whose double tongue may with mortal touch throw death upon thy ... enemies.”

According to the French naturalist and early evolutionist Jean-Baptiste Lamarck, snakes’ limited vision obliged them to use their forked tongues “to feel several objects at once.” Lamarck’s belief that the tongue functioned as an organ of touch was the prevailing scientific view by the end of the 19th century.

SMELLING WITH TONGUES

Clues to the true significance of snake tongues began to emerge in the early 1900s when scientists turned their attention to two bulblike organs located just above the snake’s palate, below its nose. Known as Jacobson’s, or vomeronasal, organs, each opens to the mouth through a tiny hole in the palate. Vomeronasal organs are found in a variety of land animals, including mammals, but not in most primates, so humans don’t experience whatever sensation they provide.

Scientists found that vomeronasal organs are, in fact, an offshoot of the nose, lined with similar sensory cells that send impulses to the same part of the brain as the nose, and discovered that tiny particles picked up by the tongue tips ended up inside the vomeronasal organ. These breakthroughs led to the realization that snakes use their tongues to collect and transport molecules to their vomeronasal organs – not to taste them, but to smell them.

In 1994, I used film and photo evidence to show that when snakes sample chemicals on the ground, they separate their tongues tips far apart just as they touch the ground. This action allows them to sample odor molecules from two widely separated points simultaneously.

Each tip delivers to its own vomeronasal organ separately, allowing the snake’s brain to assess instantly which side has the stronger smell. Snakes have two

tongue tips for the same reason you have two ears – it provides them with directional or “stereo” smell with every flick – a skill that turns out to be extremely useful when following scent trails left by potential prey or mates.

Fork-tongued lizards, the legged cousins of snakes, do something very similar. But snakes take it one step farther.

SWIRLS OF ODOR

Unlike lizards, when snakes collect odor molecules in the air to smell, they oscillate their forked tongues up and down in a blur of rapid motion. To visualize how this affects air movement, graduate student Bill Ryerson and I used a laser focused into a thin sheet of light to illuminate tiny particles suspended in the air.

We discovered that the flickering snake tongue generates two pairs of small, swirling masses of air, or vortices, that act like tiny fans, pulling odors in from each side and jetting them directly into the path of each tongue tip.

Since odor molecules in the air are few and far between, we believe snakes’ unique form of tongue-flicking serves to concentrate the molecules and accelerate their collection onto the tongue tips. Preliminary data also suggests that the airflow on each side remains separate enough for snakes to benefit from the same “stereo” smell they get from odors on the ground.

Owing to history, genetics and other factors, natural selection often falls short in creating optimally designed animal parts. But when it comes to the snake tongue, evolution seems to have hit one out of the park. I doubt any engineer could do better. ●

WE KNOW ONE THING ABOUT IRAN’S NEW PRESIDENT, EVEN BEFORE THIS WEEK’S ELECTION. HE WON’T BE A REFORMER.

The consolidation of power within the Revolutionary Guard leaves little room for opposition politicians

By Amir Hossein Mahdavi

Iran’s presidential election on Friday seems on track to select a president from the political faction loyal to Supreme Leader Ali Khamenei and the Islamic Revolutionary Guard Corps (IRGC). Reportedly, more than 500 candidates registered for the election — but the Guardian Council, which vets electoral candidates, disqualified all but a handful. Iranian President Hassan Rouhani, a relative moderate, is ineligible to run for a third term.

Who is left on the ballot? Unlike the past six elections, the council left no reformists in the final list of qualified candidates. That leaves just seven approved candidates, mostly hard-liners — including three little-known politicians and three candidates who lost previously. None are likely to endanger the victory of the current head of Iran’s judiciary, Ebrahim Raisi.

Opinion polls show Raisi leading with more than 50 percent of the vote. These same polls project voter turnout at about 40 percent, the lowest in the Islamic Republic of Iran’s history. Young, educated and urban voters, in particular, seem likely to skip the election.

Raisi and his backers in the IRGC — the dominant military force defined in the constitution as the “guardians of the revolution” — have offered aggressive rhetoric and hawkish policies. Iran’s supreme leader oversees the IRGC, which controls Iran’s proxy groups throughout the Middle East. The official position of IRGC has always been against the 2015 nuclear deal and

any compromise with the United States and its allies. According to the Trump administration, the reason behind the U.S. withdrawal from the nuclear deal in 2018 was the IRGC presence in the region.

But surprisingly little will change in Iran, despite the political handover to revolutionaries. Here's why.

IRAN'S ECONOMIC CRISIS HAS DEEPENED

The economic crisis is worse now than in any other Iranian election year. Iran's economic growth rate dropped to an average of negative 3.7 percent since the last election. Roughly half of last year's budget was financed through government bonds — all of which mature this year — and the country is running a 30 percent budget deficit. The triangle of sanctions, the pandemic and government mismanagement have left 44 percent of the population below the poverty line, while inflation reached 46 percent, the sixth highest in the world. According to one recent poll, 68 percent of Iranians expect their economic conditions to get worse.

Officially, 82,000 Iranians have lost their lives because of covid-19, but analysts speculate the actual death rate may be up to four times as high. The pandemic resulted in the loss of 1 million jobs and contributed to the high inflation rate. And ongoing U.S. sanctions prevented Iran from accessing its financial resources abroad, while the United States blocked its request for a \$5 billion covid-19 relief loan from the International Monetary Fund.

Iranians blame the current president for the economic situation, which makes it highly unlikely that a reformist candidate would have won, even if one had been allowed to run.

THE REVOLUTIONARY GUARD'S ROLE HAS EXPANDED

In the past two decades, the IRGC has responded to the crisis by gradually expanding its administrative roles and the scope of its activities to include regional politics, culture, infrastructure, commerce and the covid-19 pandemic response. This has tipped the balance of power between Iran's institutions away from the presidency and toward an "invisible government" run by the Revolutionary Guard. In April, for example, a leaked recording revealed Foreign Minister Mohammad

Javad Zarif's complaints that he had "zero" influence on foreign policy — the IRGC was calling the shots.

The Revolutionary Guard holds the power to block any policy reform. Paradoxically, a president who shares the IRGC's priorities could help the regime normalize and break the gridlock in foreign policy, namely, regional relationships and the stalled nuclear negotiations with the United States, the European Union and other parties. Currently, the IRGC and other leaders' subordinates have the ultimate say over every critical aspect of foreign relations, such as regional proxies, missile programs and the nuclear deal.

This setting radicalizes Iran's behavior in two ways. First, the IRGC is advancing its international ambition without coordination with the administration — but the administration is responsible for the economic setback caused by IRGC policies. And second, Iran's supreme leader and his subordinates have allocated ample resources to constrain the power of elected presidents. The election of Raisi could merge the authority and responsibility in Iran and alleviate the rivalry between the elected branch and IRGC, especially because the new president will have no choice but to seek relief from sanctions to ease the government's access to blocked assets and allow Iran to resume regular sales of oil.

IS THIS IRAN'S NEW ERA?

The election will have bigger implications for the long-term outlook for consolidating the power of the "revolutionary current." Iran's supreme leader is maneuvering the country into a new era of consolidated power and reduced electoral competition, counting on "a new generation of revolutionary youth" to manage what he calls the "Second Phase of the Revolution." The new terminology of "revolutionary current" is significant, signaling a nonpartisan coalition in which there is room only for loyalists rather than ongoing factional battles.

Succession is a leading issue in this election, given Khamenei's age (82). Efforts are underway to fortify the power of the current leader's office in the forthcoming leader transition. In recent years, younger clerics have replaced Khamenei's elderly representatives in the provinces. Additionally, the IRGC and loyal subordinates of the leader have trained a new generation of young revolutionaries — some of whom became legislators in

the 2020 parliamentary elections — to occupy critical administrative positions.

The push to consolidate power will block any prospect of Iran's reformists gaining power through elections in the near future. But this dynamic carries a cost — it would minimize the regime's legitimacy through representation. The next president will need to win legitimacy through performance to avoid social unrest like the violent protests last year that resulted in more than 300 casualties. And these concerns explain why we should not expect an aggressive foreign policy from Iran's next president. ●

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CRITICAL RACE THEORY HAS PROVED DIVISIVE. WHAT IS IT?

By Erica Moser

Rooted in legal scholarship and academia, critical race theory experienced a small spike in public consciousness last September — shortly before former President Donald Trump signed a related executive order — and then interest skyrocketed over the past two months.

Signs saying, "Stand Up Greenwich: Unmask our children, ban critical race theory, protect medical freedom" popped up earlier this month in Greenwich. People have raised concerns about critical race theory to the boards of education in Greenwich and in East Lyme. More than 500 people have signed a petition asking the Guilford Board of Education to disavow critical race theory.

Republican legislators in at least 22 states have introduced bills targeting the teaching of critical race theory or certain "divisive concepts." A month ago, 20 Republican attorneys general wrote an anti-CRT letter to the U.S. Department of Education Secretary Miguel Cardona saying the department shouldn't fund "any projects that characterize the United States as irredeemably racist or founded on principles of racism."

Lewis Gordon, head of the philosophy department at the University of Connecticut, called the latter statement a false dilemma.

"To say that the United States is a country that was built on racism and colonization and genocide is not to say that's the only things the United States were built on," he said, "because throughout, there were people — including among whites — who fought against white supremacy, racism, colonialism and genocide."

So, what is critical race theory, and how did the phrase become so pervasive in current discourse? And is the backlash actually to critical race theory, or to something else?

Its origins date to the 1970s and '80s, and the late Harvard Law School professor Derrick Bell.

Quinnipiac University School of Law professor Angela Robinson, who teaches a course called Critical Race Theory, said it started with a group of lawyers and law professors who came up with the principles that race is a social construct and that "racism is pervasive in our society because we really haven't unpacked the effect of race."

"Critical race theory says that systems are designed to get the results they get, and so if we are continually having racial disparities — which we have in wealth and education and health outcomes — that must be because there is something in the system that is continually producing those results," Robinson said.

She said she teaches her students that critical race theory is one way to look at things but not the only way.

Robinson and other scholars of critical race theory say some misconceptions are that it wants white people to feel guilty about being white and that it's rooted in Marxism.

DISHONEST TAKES ON BOTH SIDES

Gerald Torres, a Yale School of the Environment and Yale Law School professor who is a scholar of critical race theory, said he has "no idea whether people are being taught to feel guilty or not, but in any event, that's not critical race theory." He and other professors say the term is now being used as a "boogeyman."

Critical race theory began by viewing race as an organizing principle to examine legal doctrine, but

Torres said it then moved from law schools to schools of education, and began to inform sociological and historical inquiries.

"Race has played a role in American history, and it doesn't diminish the virtues of American society to say that it did," Torres said.

William Lugo, sociology and criminology professor at Eastern Connecticut State University, doesn't explicitly tell his students, "Now this is critical race theory" but it's embedded in his curriculum, as he looks at how race and racism have shaped policies and criminal justice.

He feels "frustration" with the current discourse around the theory, saying it's getting misrepresented by a focus on the most extreme examples, and he sees dishonest takes on both sides, thanks to Twitter.

Teaching criminal justice, Lugo said he tends to have a pretty even split between liberal and conservative students, and they typically respond well to critical race theory concepts.

"I don't get this sort of lightning rod backlash that you see online, and I've been doing it for 16 years," he said.

'DIVISIVE CONCEPTS'

Yi-Chun Tricia Lin, professor and director of Women's and Gender Studies at Southern Connecticut State University, called the backlash to critical race theory an "orchestrated panic" but doesn't think all this attention is a bad thing.

In October, she organized a weeklong Critical Race Theory Teach-In at Southern. It was a response to Trump's Sept. 22 signing Executive Order 13950, which prohibited the United States Uniformed Services or government contractors from providing workplace training on certain "divisive concepts" and allowed federal agencies to require that grant recipients not use federal funds to promote such concepts.

The list of divisive concepts includes that "one race or sex is inherently superior to another race or sex"; "the United States is fundamentally racist or sexist"; "an individual, by virtue of his or her race or sex, bears responsibility for actions committed in the past by other members of the same race or sex"; "any individual should feel discomfort, guilt, anguish, or any other form of psychological distress on account of his or her race or sex."

The U.S. District Court for the Northern District of California in December issued a preliminary injunction banning enforcement of parts of the order pertaining to contractors and grantees, on First Amendment and Fifth Amendment grounds. President Joe Biden revoked the order on Jan. 20.

At SCSU in October, at a kickoff virtual discussion with 10 speakers, multiple professors said it would be impossible to do their jobs effectively without critical race theory.

"We cannot discuss or critique America, as social scientists, without discussing or critiquing racism in this country, as racism is embedded in the very fabric of the United States," sociology professor Cassi Meyerhoffer said.

Janani Umamaheswar, also a sociology professor, questioned how we can approach a solution to the incarceration of Black and Latino people "at such alarming rates" without recognizing the role race plays, and said a colorblind approach to questions of social equity is "fundamentally flawed."

Siobhan Carter-David said it's impossible for her to teach American history "without pulling from an understanding about the role that white supremacy had in crafting the United States, even if we start after slavery ends." She listed a slew of racialized practices: convict leasing, health care experimentation, political disenfranchisement, redlining, unethical banking practices, the war on drugs.

"I don't think that anti-racist activists or people who teach critical race theory have ever made the argument that people should take responsibility for the actions of their ancestors, but rather to understand how this manifests itself today," Carter-David said.

This past week, UConn sociology professor Noel Cazenave said critical race theory first developed at a time when there was a backlash to the civil rights movement, and he sees the current attention as "a highly organized backlash" to systemic racism being forced into national discourse through protest last summer.

"Critical race theory is a perfect foil because nobody knows what the heck it is," Cazenave said.

University of New Haven professor and retired Navy officer Robert Sanders, who chairs the National Security

Department, and teaches a course called Security, Sovereignty, and Slavery, said those who latched onto critical race theory "as the new boogeyman" say, "Oh, this is just another way of them telling us America is bad." But, he said, "No, America is not bad; America, just like a lot of other countries in the world, have done bad things."

A key orchestrator of the conflict over critical race theory is Christopher Rufo, a senior fellow at the conservative Manhattan Institute for Policy Research, who told *The New Yorker* — in a profile he called "accurate, fair, and thoughtful" — the term "is the perfect villain." Rufo helped draft Trump's executive order, after the former president saw Rufo talking about critical race theory on "Tucker Carlson Tonight."

Rufo tweeted in March, "We have successfully frozen their brand — 'critical race theory' — into the public conversation and are steadily driving up negative perceptions. We will eventually turn it toxic, as we put all of the various cultural insanities under that brand category."

SOME STATE REPUBLICANS PUSH BACK

On June 7, Sen. Rob Sampson, R-Wolcott, proposed an amendment to Senate Bill 1073, which has the stated purpose of requiring "a study of state agency policies and programs to assess the equity of state government programs and the allocation of state resources."

The amendment would have prohibited Connecticut schools from teaching "divisive concepts," the same ones referenced in Trump's order, to students in kindergarten through 12th grade.

"I firmly believe that we have got to get a hold of our education system in this state and in this country, and remind the next generation that America is the greatest place on Earth," Sampson said.

In response to questions from Sen. Mae Flexer, D-Windham, and Sen. Matt Lesser, D-Middletown, Sampson said the bill wouldn't prohibit teaching the Civil War or civil rights movement, and he believes schools should be able to teach that the founding fathers owned slaves.

Flexer pushed back against the part about students not feeling "discomfort, guilt, anguish, or any other form of psychological distress."

"I just don't know how we can legislate the feelings of the students," she said. She added, "I would argue that sometimes a feeling of discomfort, guilt or anguish might actually make a student want to learn more, might make a student want to engage in policies to change what they're learning about."

The amendment ultimately failed on a party-line vote, but the overall bill passed without any opposition.

During the back-and-forth between Sampson and Flexer, neither used the term "critical race theory," though Sampson did later say he offered the amendment "to prohibit the teaching of critical race theory in Connecticut schools."

Sampson apologized on the Senate floor for "not bringing what are many, many examples of these divisive concepts being taught in the classroom across our state" but told *The Day* on Friday, "I never said there were examples; I was doing it preemptively."

After the vote, Sampson emailed constituents asking people who "know of efforts to incorporate Critical Race Theory in our schools" to email him.

He told *The Day* that "people have certainly contacted me on the subject" but "I don't want to provide anything at this time," that he's pulling something together and wants to do that on his own timeline.

He did point to a statement this week on critical race theory from the State Education Resource Center of Connecticut, which is leading the development of a new course of studies under a state law requiring the inclusion of Black and Latino studies in public school curriculum.

SERC said through its research, it learned that CRT "strives to advance a social justice framework," explains how race and racism operate, is typically interdisciplinary and recognizes that race works with "gender, ethnicity, class, and sexuality as systems of power."

"We know how confusing and disruptive some of these concepts can seem — because we felt it too," SERC wrote. "But it became impossible to ignore the legacy of racism and its impact on our educational system. We could not discount students' lived experience with race and because of their race. These are their stories, and they have gone untold for so long."

Sampson also joined a virtual town hall that Rep. Kimberly Fiorello, R-Greenwich, held Monday about critical race theory called, "Why is the Accusation of Racism Everything and Everywhere?" She said many parents in Greenwich and Stamford reached out to her with concerns about what they were seeing in their classrooms.

Her featured guest was anthropologist Peter Wood, president of the National Association of Scholars and author of "1620: A Critical Response to the 1619 Project."

Wood agrees that race is a social construct, and said it's true that racism has affected "political participation, wealth creation, housing, medicine, the labor market, sports, the military, schooling and higher education, and opportunities in the arts." But he doesn't believe racism is "foundational or intrinsic to American institutions."

Fiorello also went on Fox News to criticize the passage of a bill that, in part, declared racism a public health crisis, which she said "is critical race theory in our laws." While only one Democratic representative voted no on the bill, Republicans in the House were split: 22 voted in favor and 32 against. ●

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BAD HOLOCAUST EDUCATION LEADS TO BAD HOLOCAUST ANALOGIES

It's not about the facts of the Holocaust, but how we present them.

By Avinoam Patt

On June 15, Rep. Marjorie Taylor Greene (R-Ga.) paid a visit to the United States Holocaust Memorial Museum, then held a news conference at the Capitol, where she said that she had made a mistake when she compared mask mandates to the Holocaust. Ostensibly contrite, Greene acknowledged that "there's nothing comparable

to it. It happened and, you know, over 6 million Jewish people were murdered."

By any reasonable standard, one shouldn't have to visit a museum to understand the horrifying scope of the Holocaust. Nor should one have to do so to understand that it is ridiculous to conflate vaccination passports and "gold stars," as Greene did. But while Greene's comparison of mask mandates to Nazi Germany is, indeed, a failure of Holocaust education, the problem isn't simply her ignorance of the facts. To the contrary, Greene's glib simile is indicative of a far more sweeping problem with the way we teach people about the Holocaust.

When I worked at USHMM as an applied research scholar from 2004-2007, it was not uncommon to see someone standing outside the facility with a placard, manipulating the memory of the Holocaust for different political goals. Sometimes they'd be protesting abortion, sometimes the consumption of animal meat or the fur trade. And sometimes, even in those pre-covid days, vaccinations were the object of their ire. None of these comparisons would stand up to minimal inspection, but the fact that protesters felt comfortable making them was revealing. According to their syllogistic reasoning, the Holocaust is the worst thing; therefore, anything they consider bad can be equated to the Holocaust. The effect of widespread Holocaust education, in other words, has been to teach people just enough to let them make fatuous comparisons, to treat it as a frame of reference for all subsequent events.

In recent years, the rise in hate speech, antisemitism, racism and xenophobia has provided renewed momentum to legislative efforts, bringing the number of states requiring some form of Holocaust and genocide education to 19, as of this month. Even so, state boards of education rarely provide the additional resources necessary to gain specialized training on the topic. Holocaust education is often folded into state social studies standards, incorporated into history classes, typically accompanied by supplemental readings in the language arts. Exceptional teachers, dedicated to pursuing the study of the topic with their students, are often forced to seek out professional development opportunities on their own. With too many topics to teach and not enough days to do so, teachers often have time for only a brief tour through the symbols of the Holocaust within the broader

context of American or European history: swastikas on uniformed arms and flags, photos of concentration camps, and, yes, the yellow stars upon which Greene seized.

Greene's brief visit to the Museum probably did not include a tour of the exhibit "Americans and the Holocaust," which is closed due to covid-related restrictions. This exhibit provides information about just how much average Americans knew about Nazi persecution of Jews, and how little this knowledge did to encourage protest, interventions to stop it, or changes in political behavior. Just weeks after the November 1938 Kristallnacht pogrom, while 94 percent of Americans polled disapproved of the Nazi treatment of Jews in Germany, over 70 percent still did not want more Jewish refugees to immigrate to the United States. Those numbers barely shifted in postwar surveys, even after GIs shared stories about the horrors of the camps and newsreel footage became widely available.

Americans have always maintained an emotional distance from the Holocaust, treating it as an event that happened far away on European soil, and that mostly served to confirm the ultimate triumph of democracy over fascism. As Jewish studies scholar Alvin Rosenfeld argues, "The very success of the Holocaust's wide dissemination in the public sphere can work to undermine its gravity and render it a more familiar thing." We recognize the Holocaust as a symbol of ultimate horror, but typically decline to let that horror inspire us to action, preferring instead to treat it as a free-floating signifier of evil. Conventional Holocaust education — which offers a service-level, brief survey of the topic — fails to help students understand the underlying causes and complicated context that made the Holocaust possible. It stands as an anomaly, rather than an extension of antisemitic beliefs and policies to their worst possible conclusion, genocide. The memory of the Holocaust thus becomes trivialized, often used in the service of "relevance" to teach simplistic moral lessons, meet mandated learning outcomes, or score political points.

Holocaust survivors who came to the United States tried to break through the apathy and indifference of their new neighbors, but found language inadequate to convey the terror of what they endured or the anger they felt at the world's silence in the face of it. Elie Wiesel, among the most prominent of the survivors to

advocate for the creation of a memorial museum on the National Mall, argued that the presence of the museum must serve not as an answer, but as a question. Speaking to President Bill Clinton and others gathered at the Museum's opening on April 22, 1993, Wiesel encouraged the Museum's visitors, as they walked through the exhibits, to "ask yourselves how could murderers do what they did and go on living? Why was Berlin encouraged in its belief that it could decree with impunity the humiliation, persecution, extermination of an entire people?"

Wiesel did not believe such questions had answers. Instead, he wanted us to sit with the uncomfortable fact of what apathy and indifference for the plight of others might lead to. "What have we learned?" he asked. "We have learned some lessons, minor lessons, perhaps, that we are all responsible, and indifference is a sin and a punishment. And we have learned that when people suffer we cannot remain indifferent."

Despite Wiesel's challenge, we now live in a moment when someone like Greene can pay a short, symbolic visit to USHMM and leave potentially better equipped to twist the tragedy of the Holocaust to her own ends. Indeed, after her visit, she renewed her comparison of the Democratic Party to the Nazis, calling them both National Socialists. Museums and memorials can easily become props, facilitating public pieties that rarely lead us to change our behavior. As James Young has argued, this may be in the nature of institutions that "do our memory work for us," a process that is almost inevitably bound to make us more passive and forgetful in our own lives.

The Holocaust can seem like an overwhelming topic, beyond comprehension or understanding. The permanent exhibition at USHMM occupies 36,000 square feet of gallery space, far more than can be absorbed in a brief visit. The USHMM "Encyclopedia of Ghettos and Concentration Camps" documents that "the Nazis and their allies ran more than 44,000 camps, ghettos, and other sites of detention, persecution, forced labor and murder during the Holocaust." This enormous topic should not merely be another box to check off on a list of graduation requirements, with facts and pieces of information that can be easily measured. Yes, the historical facts matter, especially in our age of denial and disinformation, when history can be so easily distorted. But shouldn't we also, as Wiesel proposed, strive to leave those we teach with more

questions, concerned about the human condition and the suffering of others? We live in an age where complexity is discouraged, when tangled and thorny problems can be reduced to simplistic explanations. What if studying the Holocaust challenged our preexisting world views, forcing us to engage in difficult conversations about our collective past, present and future?

These educational goals have their limits, of course. It is easy to say that education can confront hatred, denial, and discrimination, that state mandates requiring Holocaust education or visits to Holocaust museums are the key to building a better democracy — to ensure that when tyranny rises, it does not prevail. However, we cannot use the memory of the Holocaust as a substitute for actual learning or as the answer to every difficult question. We have an obligation to those who were once abandoned and ignored, to ensure that even in death, their memories not be minimized, their lives treated again as less than human. ●

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IT'S CICADA SEASON: READY FOR BULGING RED EYES, LOTS OF SCREECHING AND A LIGHT DOUSING OF STICKY BUG JUICE?

By Morgan Greene

On a steamy weekday morning, along the eastern edge of Illinois, beams of light pierced through the leafy cover above Kickapoo State Park. A pulsating chorus swelled and steadied: cicada mating calls. A fine mist hung in the air: cicada pee. A man crunched down on a few of the twitching insects and said they tasted buttery: cicada brunch.

Brood X summer is in full swing in east-central Illinois, where 17-year periodical cicadas crawled their way up through thousands of straw-sized holes in the earth

around Memorial Day to make the most of the end of their lives.

The brood appears in only a few areas of Illinois, which houses the western edge of the national population near the Indiana state border. This year, researchers traveled to Vermilion County to check out some dense concentrations.

On a drive to Vermilion County, the bugs — the larger ones often still smaller than a thumb — make their presence known by smashing into windshields. On the return trip, even after leaving the cicadas behind, a ringing in your ears might serve as a reminder of your recent company.

Brood X, which surfaces in more than a dozen states in the Midwest and eastern United States, has caused some trouble in recent weeks. A man crashed his car in Cincinnati after a cicada flew into his face. A plane carrying reporters to President Joe Biden's first overseas trip was grounded for hours after cicada interference. The brood is so numerous the bugs may have shown up on weather radar. But the insects are generally harmless.

Some entomophiles are following along virtually, preparing for 2024 when 13-year and 17-year broods will surface throughout Illinois. For those who dare step into Brood X's world — one filled with bulging red eyes, lots of screeching and a light dousing of sticky bug juice — the insects can be more oddity, or wonder, than nuisance.

They can also leave behind some lessons more permanent than their fleeting adult lives.

"They struggle to get up to the ground, and they're only alive for a very short period of time," said Carolyn Krainak, of Aurora. "And they're just all out. They are living their lives. They are going full force."

Krainak's family passed below cicada-filled branches in a canoe along a river 17 years ago, and today the Vermilion County trip is among her fondest memories. She doesn't expect others to understand the interest; her kids don't remember the cicadas at all, just making s'mores. But she'd like to return and see Brood X in all of its splendor before it's too late.

"Everything else can be going on and chaos, but they're going to get the job done," Krainak said. "They're going

to do what they have to do. And I think we can learn from that.”

OVERTAKEN BY CICADAS

“They’re in the trees, they’re in the prairie, they’re on people.”

That’s how Tim Edison, the superintendent of Kickapoo State Park, summed up Brood X’s proliferation.

“I know people that aren’t expecting them are really surprised, especially in the campground, because they are really loud,” Edison said.

On a recent morning, it was possible for two to land on your back without realizing, only to be picked off and eaten alive by Edison. He appeared visibly disappointed in the Tribune reporter and photographer who couldn’t work up the courage to pop a live one into their mouths.

Wildlife seemed to be enjoying the limited-edition food option, as well.

“Below some of the bird nests you see a lot of cicada wings,” Edison said.

Other cicadas could be detected by a slight poke from their mouthparts, which allows them to suck out nutrients. Some don’t seem to understand the difference between people and plants.

Visible streams of honeydew — cicada pee — shot through the air. The choristers — male cicadas — were relentless, their mating calls a constant, grating static of modulated swells.

If you took the time to stare at one of the Brood X representatives resting on your hand or crawling up your leg, you might notice their neon-orange windowpane wings, variations between the bugs including dark or striped undersides — or maybe just their absolute weirdness.

“If someone’s never experienced something like this, it’s really cool to come here and see,” Edison said. “The peace and quiet and tranquillity that you sort of think you’re going to see in the middle of a wooded park all of a sudden changes when it gets taken over by probably billions of cicadas.”

Mark and Anna Goddard were out at Kickapoo, where they had made peace with the campground invaders.

They pointed out some residue on their camper’s windshield from cicada guts. Anna Goddard shared a cicada photo with friends on social media the night before. “They are annoyingly loud but incredibly intriguing,” she wrote.

One landed on Anna Goddard. She watched it walk a few steps with its wiry legs, and then buzz away.

“If it’s only the males that make that sound, think of how many males are out there,” she said.

“You can’t be too annoyed by it,” Mark Goddard said. “It’s just another life cycle on the big blue spinning ball.”

COMING OUT PARTY

They rose from the earth at sunset.

“By the third night you could not walk a step, you couldn’t move your foot without stepping on one emerging out of the ground,” said Lara Danzl, environmental education supervisor of the Vermilion County Conservation District, referring to Brood X’s arrival a couple of weeks ago. “Watching them come out of that nymph exoskeleton with their transparent body and their transparent wings, they’re almost like this white ghost.

“And they start to crawl toward any tall structure — whether that be a tree, or a semi-sturdy branch of a plant or even your leg,” said Danzl, based at Kennekuk County Park, another cicada hot spot.

If you look at one of the exoskeletons, you can often see the seam where they escaped. The cicadas molt just about everything — their tracheal tubes, their eyes — as they complete a slow burst out of their casing. The insects sometimes grab on to the old covering to allow their wings to expand; their black and orange colors usually set in the day after.

“It almost reminds me of something out of ‘Star Wars’ or some science fiction movie,” Danzl said.

Danzl was around for Brood X’s last round and still remembers the sound. “What I don’t remember from 2004 is the immensity of the numbers,” she said as she watched them fly outside her window. “It’s just crazy to think that you’re underneath the ground for 17 years and then you’re an adult for just a few weeks.”

Calls have come in from curious out-of-state travelers and from northern Illinois, asking about the cicadas, Danzl said. Some people interested in renting shelters have also asked how they might avoid the bugs.

“They’re not wanting the cicadas out here for their June wedding,” Danzl said. “But it’s a great story that you can always tell. It’ll make another memorable aspect of your day out here at the park if you got married with the cicadas, or had a graduation party with the cicadas.”

Susan Biggs Warner, historical interpreter for the Vermilion County Conservation District, has seen a few rounds of the cicadas and will lead a Saturday hike in Forest Glen Preserve, featuring cicada history and facts. What’s new this round is growing public interest.

“I don’t ever remember so many people coming out just specifically to experience it,” Biggs Warner said. “I think it’s a sign that people are a little more aware of nature, and maybe a little more curious.”

CONSERVATION CLUES

Near Salt Fork, Katie Dana grabbed nets and a cage and set out along a trail in search of some particular cicadas. Dana, a scientific specialist in entomology with the Illinois Natural History Survey, arrived in the Midwest for graduate school and soon found herself fascinated by everything cicada. She now studies the insects throughout the state, spending time near the undisturbed soil of cemeteries and railroad prairies.

Katie Dana, an entomologist with the Illinois Natural History Survey, gathers Brood X cicada specimens in Vermilion County on June 11, 2021.

Katie Dana, an entomologist with the Illinois Natural History Survey, gathers Brood X cicada specimens in Vermilion County on June 11, 2021. (E. Jason Wambsgans / Chicago Tribune)

Walking past cicada exoskeletons hanging from tree branches, a leaping fawn and a rat snake, Dana picked a cicada off a branch, inspected its underside, looked into its zombie eyes and flicked it forward to send it flying off again.

“Going out to these sites and documenting where these broods are is important because we’re not going to get a chance for another 17 years,” Dana said.

Dana was on the hunt for a male and female of each species to take back to the Champaign-Urbana lab. Brood X includes three species — *Magicicada septendecim*, *Magicicada cassini* and *Magicicada septendecula* — able to be differentiated by calls created from tymbals, vibrating membranes inside their abdomen. There are also physical differences, including undersides with or without stripes, and colored spots between eyes.

Dana was also on the lookout for cicadas hosting an unusual fungus — one that leads to their butts falling off, doses them with a psychedelic-amphetamine cocktail and turns the males hypersexual.

Signs of mating could be spotted, along with evidence of egg laying in branches.

In a few weeks, nymphs smaller than a grain of rice will fall to the ground and burrow into the earth for 17 years, preparing for the next jamboree.

Farther south in Forest Glen, a mix of exoskeletons and dead cicadas pooled around a sugar maple near the visitors center, greeting those who came close with the smell of hot garbage.

Thousands of cicadas gathered on one hawthorn tree, turning its trunk into a pointillist painting humming with life. In the tree’s general vicinity, a noise-measuring app recorded levels around 90 decibels — a swell about as loud as a lawn mower.

By the end of the sweltering day, with researchers coated in sweat and probably some cicada honeydew, Dana was asked if plucking cicadas from branches ever gets monotonous, or old.

“I still enjoy it, every day,” Dana said. “I still bring my work home with me. Literally.”

Back at the lab, researchers recorded the males’ calls, and pinned them up for photos. After death, some of the bugs would become part of the survey’s collection, which contains cicadas from more than 100 years ago.

Tracking and testing the brood is important because it allows researchers to follow long-term shifts in population and range, and gather conservation clues.

“The climate change question is huge in all of our minds these days,” Dana said.

John Cooley, a University of Connecticut at Hartford professor, has traveled the state and across the country to map cicadas. Kickapoo is “pretty spectacular,” he said, but he also recommended driving Illinois Route 1 south from Marshall.

Some range shifts occurred this year, Cooley said, but nothing major. And some cicadas from another brood — three years early for 2024 — were spotted at Bemis Woods Forest Preserve outside Chicago.

OTHERWORLDLY EXPERIENCE

In Vermilion County, 17 years ago, the familiar song of cicadas sounded new to Carolyn Krainak — like a siren.

“It was just an unreal sound,” said Krainak, who grew up in Illinois with annual cicadas. “I would say it was deafening.”

Krainak thought the trip was headed toward disaster — two young kids, a headache of a soundtrack, six-legged insects ready for a nighttime crawl.

“We had no idea what we were getting into,” Krainak said.

The family couldn’t talk to each other while they were eating their lunch. But by night, everything quieted down and they were able to sleep.

When Krainak realized Brood X would be back this year, she wanted to revisit the site of her otherworldly experience.

“Most people were looking at me like I was crazy, because most people are trying to avoid that,” Krainak said.

Yet there’s something about having a front-row seat to the cycle of life.

“I just want to hear it again,” Krainak said. “It just completely overtakes you, all your senses, when you’re there with them.”

Jessica Kent, of Lombard, is participating in Brood X celebrations virtually for now, but she carries a permanent homage to the cicada.

Kent saw an image of a cartoon cicada and shared it with a friend. The friend asked if they should both get cicada tattoos. Now, Kent has a frantic-looking insect imprinted on her skin with the text: “Time to scream.”

Her favorite reaction so far happened in Costco. From across the store, a voice called out, “Is that a cicada?”

Kent confirmed.

“That’s awesome,” the admirer said. “It’s year 17!”

“It just felt like people were cheering for a sports team,” Kent said.

Kent has enjoyed seeing other cicada tattoos — one more realistic with a sprinkling of Old Bay seasoning, another a Pride cicada.

“The idea of a giant bug is not super appealing,” Kent said. “But they’re like winged, weird puppies. They’re just really cute.”

Kent ordered a cicada plushie, able to be unzipped from a pouch.

“I feel like it’s when a band that you love is touring,” Kent said. “Oh, they’re just kind of outside of where I am. But I’m still going to buy the merch.”

Kent accidentally dug up some cicadas in the fall while doing some landscaping work — a reminder of what’s growing below.

“2024, that’s our year,” Kent said.

In 2024, broods of 13- and 17-year-olds will cover the north and south of the state. The rare crossover of northern Brood XIII, a 17-year group, and Brood XIX, 13-year cicadas, offers once-in-a-lifetime research opportunities for scientists. And more chances for fans to find meaning in the bugs.

Some think of them as aliens; others as a lifeline to summer memories. They’ve been written about as the souls of poets, screaming out because they have more to write. Maybe it’s something more simple.

“They’re not really motivated for anything other than existing,” Kent said. “Which is kind of interesting.” ●

SEE YOU IN 17 YEARS: AMERICA'S CICADA PLAGUE WINDING DOWN

By Ines Bel Alba

They've been everywhere, crawling up trees and flitting about clumsily in search of a mate, droning loudly, causing auto accidents and even daring to land on the neck of the US president.

Now the curtain is coming down for the latest brood of cicadas, the disquieting insects that appear briefly in their trillions in the US every 17 years. These huge swarms that have been spawning headlines—and headaches, in some cases—for Americans are dying off.

The infestation began in April and May in some eastern and midwest US states such as Maryland and Ohio, and the capital Washington.

For weeks these harmless thumb-sized bugs with striking red eyes and translucent wings did what cicadas are supposed to do: emerge from the ground as babies, molt, mate, lay eggs and die.

'IT GOT ME'

The "periodical" cicada waits underground as a nymph for almost its entire 17-year life cycle, making the journey to the surface when the soil reaches a perfect 64 degrees Fahrenheit (18 C).

As they always do, the Class of 2021 made a bit of a nuisance of itself. They do not fly well, constantly bumping into windows, cars and people, making an angry hissing sound as if the collision were not their fault.

The brood had its most prominent 15 minutes of fame on June 9 when President Joe Biden swatted one from his neck as he waited to board Air Force One for his first trip abroad.

"Watch out for the cicadas. I just got one—it got me," Biden said with a smile as he approached a group of reporters.

There were so many cicadas in the Washington area they would actually show up on weather radar screens.

The night before the Biden incident, a swarm of the insects clogged the engines of a press plane due to accompany the president to Europe, delaying those journalists for hours until another aircraft was found.

And while cicadas do not bite or sting people, they do cause trouble, as happened in Cincinnati, Ohio.

"Historically each time they emerge, there have been several car crashes attributed to their presence. This year is no different," Cincinnati police wrote on Facebook.

The police went on to explain that a young man happened to drive through a swarm of cicadas with his window open and one of them hit him in the face, temporarily stunning him.

"He then crashed into a utility pole," police said. The driver was not seriously injured. "Remember to keep your windows rolled up until our little red eyed friends are gone."

'EVERY 13 YEARS?'

Now, as the bugs die off, the drone of the cicadas has fallen silent in some regions that had been infested and the dried up, crunchy bodies of dead insects litter sidewalks.

For the rest, it is just a matter of time.

And for entomologists it is time to evaluate the latest chapter of this very rare event.

"In some places, they appear to have expanded their range, while in other places, their range has shrunk. It's going to take time to sort through the data," said John Cooley of the Department of Ecology and Evolutionary Biology of the University of Connecticut in Hartford. He launched a project to map the cicadas.

Entomologist Zoe Getman-Pickering examines cicadas at the foot of a tree on May 20, 2021 in Chevy Chase, Maryland.

"Where trees have been removed and surfaces built, cicadas are gone for good. However, where agricultural lands have reverted to parks or residential properties and trees have been planted, there are more cicadas,"

said Michael Raupp of the entomology department at the University of Maryland.

As for climate change, it will affect these bugs but it is not yet clear exactly how, said Cooley.

"That's why our detailed mapping project is so important. We are making baseline maps to look at in the future," he said.

Raupp said global warming will allow cicadas to expand their range northward and emerge earlier in the year.

Another hypothesis, he said, is that some cicadas could emerge every 13 years instead of 17. ●

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FIGHTS OVER COVID-19 VACCINES ARE SPILLING OVER TO OTHER TYPES OF SHOTS

The Tennessee Department of Health is suspending childhood vaccine outreach

By Nicole Wetsman

The Tennessee Department of Health is suspending outreach for all types of childhood and adolescent vaccinations, the Tennessean reported this week. Along with stopping COVID-19 vaccine events at schools, the department will no longer do outreach for the HPV vaccine, isn't planning for flu shot clinics at schools, and is taking the department's logo off of back-to-school vaccination information sheets. The shift in policy came after Republican lawmakers in the state got upset that the department was promoting COVID-19 shots for teenagers.

It's a strong signal that the politicization and backlash around the COVID-19 shots, driven by conservative politicians and right-wing commentators, is spilling over to other types of vaccinations. It's not the first time politics has impacted unrelated public health work during the pandemic — over a dozen states have proposed limiting public health powers as part of

backlash to pandemic-related restrictions. But it's the first time the target has been standard vaccines.

"It's insane," says Seth Kalichman, a professor of psychology at the University of Connecticut who's studied anti-vaxxers. "It's exactly the kind of overgeneralization that can occur with misinformation."

The initial trouble in Tennessee started when conservative lawmakers criticized Health Commissioner Lisa Piercey for recommending COVID-19 vaccines to teenagers. The health department also fired Michelle Fiscus, the state's top vaccine official, after she circulated a memo to doctors explaining a state law that allows minors to get medical care without parental consent. Fiscus said she was a scapegoat, fired to mollify the angry lawmakers.

Around the same time that Fiscus was fired, the department also stopped all vaccine outreach targeting teens or children. Health department spokesperson Sarah Tanksley told the Tennessean that the state has high childhood vaccination rates. "We are simply mindful of how certain tactics could hurt that progress." She said the department is planning to research vaccine hesitancy and that the changes are in response to "an intense national conversation that is affecting how many families evaluate vaccinations in general."

The jump from COVID-19-specific rollbacks to generalized rollbacks concerns Adriane Casalotti, chief of public and government affairs at the National Association of County and City Health Officials. "This is a very clear case of COVID-19 vaccination policy impacting other vaccinations," she says. "We're really concerned about the news that's coming out of Tennessee."

Carryover from concerns around one vaccine to others has happened before, particularly with the HPV vaccine, Kalichman says. There's widespread misinformation around the cancer-preventing shot, and parents turn it down for their kids at high rates. "The vaccine for HPV was politicized, and the politicization and misinformation absolutely undermined vaccine confidence for a new segment of people who were not necessarily vaccine hesitant before," he says.

The situation in Tennessee isn't unique. At least 15 state legislatures are considering or have passed laws to restrict public health powers, according to an analysis from the National Association of County and City Health

Officials. In Kansas, a new law would prevent the governor from closing businesses during a public health emergency. In Ohio, the legislature would be able to override any actions by the state health department taken to control infectious diseases.

“The fact that traditional, day-to-day public health activities have been impacted in such a blunt way squarely due to politics is really concerning,” Casalotti says.

In Tennessee, at least, the law hasn’t changed: the state still has laws requiring that kids get vaccinated before school. Instead, the policy changes could make it harder for families to get the information they need to keep track of vaccine schedules and make sure their kids are ready for school in the fall, says Jennifer Reich, a sociologist who studies vaccine hesitancy at the University of Colorado. “Right now I just see a chilling climate for public health officers who are trying to do their best to inform people of how to stay safe during the pandemic, and also how to protect their children from life threatening and disabling illnesses,” she says.

The COVID-19 pandemic isn’t the first time lawmakers have tried to limit public health authority or challenge things like vaccine mandates. Those proposals usually don’t go far, says Casalotti. “The real difference that we’re seeing recently is this traction that so many of them are getting.” It shows that the messaging and misinformation from anti-vaxxers and others on that spectrum are having more of an impact. “The most frightening thing to people like me, and people in public health is when the denialists, the anti-vaxxers, and the anti-science people get the ear of the highest levels of government,” Kalichman says.

Kalichman says he wouldn’t be surprised to see what happened in Tennessee happen in other states, particularly in places with heavy resistance to COVID-19 vaccination. It’s easy to predict what could happen next: if state health departments stop promoting or helping people get childhood vaccinations, those vaccination rates could drop.

“You’re going to have outbreaks. It’s inevitable that there will be outbreaks of measles, rubella, whatever else if vaccines take a dip,” he says. “It’s just how it works.” ●

AS SEAS RISE, CT MILLION-DOLLAR HOMES PUT ON STILTS WHILE OTHERS FILL WITH WATER, EXPERTS SAY

By Jordan Fenster

Sea levels are rising, and it’s lower-income families most at risk, experts say.

“Folks that sort themselves to live directly on Long Island Sound are often the same folks that can invest in the home and adapt,” said Charle Towe, a University of Connecticut associate professor of environmental economics.

Million-dollar homes with water views can be more easily renovated to survive increasingly damaging storm surges.

“They’re going to be able to lift the house 14 feet in the air and survive those storms,” Towe said.

It’s the homes with a lower assessed value, built on a floodplain, but are a block or a mile away from the shore, that will suffer as sea levels continue to rise. According to Towe, their basements are already flooding.

“Houses that are already in that floodplain that are of low-assessed value are houses that are not being invested in oftentimes, maybe because of the flooding that they’ve already received,” he said.

It has become, Towe said, a kind of vicious cycle: Lower-value homes get flooded, which further pushes down the value of the home. “And so people were not investing in those properties, those properties are becoming more dilapidated over time, and pushing down in value.”

20 INCHES IN 30 YEARS

A 2019 report published by James O'Donnell, of the Connecticut Institute for Resilience and Climate

Adaptation, concluded that the level of the Long Island Sound should be expected to rise 20 inches by 2050.

But that date is largely arbitrary, as O'Donnell wrote. The sea is not expected to stop rising at that point. "It is likely that sea level will continue to increase after 2050," O'Donnell wrote. Towns and cities up and down Connecticut's coast have been planning for decades for an eventually wet future.

Stamford is, perhaps, an example of successful advanced planning, according to David Kooris.

"Stamford is lucky that, in the 1960s, they built a hurricane barrier here," he said. Kooris is now president of Stamford Downtown, but he was previously deputy commissioner for the state's Department of Economic and Community Development and director of resilience for the Department of Housing. Before that he was director of the Office of Planning and Economic Development for the city of Bridgeport.

Stamford, he said, "was one of three cities in the Northeast, really on the whole East Coast where they did it: Stamford, Providence and New Bedford. And we've now reaped the benefits of that."

According to the Army Corps of Engineers, "Stamford has been subject to heavy losses from storm tidal flooding since 1635."

A storm in 1938 resulted in \$6 million in damage. Hurricane Carol hit in 1954, causing \$3.4 million in damage. So, they started building a wall in May 1965, completing the \$14.5 million project in January 1969. In 2011, it was estimated that the project had saved \$38.4 million in damage.

"The barrier today provides protection to about 600 acres, which includes principal manufacturing plants, a portion of the main commercial district, and residential sections," according to the Army Corps of Engineers.

Or, as Kooris said, "everything down in the South End, all the towers, all that stuff, would not have been possible but for that investment made in the 1960s."

BUILDING WALLS AND MOVING HOMES

Seawalls, like Stamford built more than 50 years ago, are still viable options, often part of a city's resiliency plans.

New Haven, for example, is planning a \$130 million, mile-long seawall off the city's waterfront near Long Wharf to shield against climate change-related sea level rise.

"Sea level rise is happening now." City Engineer Giovanni Zinn said last week.

A seawall has also been part of nearby West Haven's resiliency plans, but the city has also employed a strategy called retreat, which calls for using federal funds to pay residents to leave flood-prone areas.

"The only example that I know of in Connecticut that has had a deployment of that funding for that purpose is in West Haven," Kooris said.

But retreat is not always that simple.

"A retreat scenario, it's important to point out, is a two-way street," Towe said. "You have to have people that want to retreat, because there is no eminent domain. So the state has to be willing to get the grant money from the federal government, and then they have to take a proposal out to the community and have people willing to sell their houses."

And even when homeowners, the local municipality and the state are in alignment, the federal government is not always willing. When Kooris was working with Bridgeport, the city applied for and was granted \$1.3 million in federal funding for the purposes of retreating from a flood zone.

"It was minor. We were going to remove two commercial establishments that were on the edge of a riparian zone in the floodplain, relocate them, turn that into a trail," Kooris said. "It wasn't big by any means."

But the grant was rescinded, Kooris said, when the federal government "realized that the property was contaminated," even though the city had been transparent about that fact in the initial application.

ECONOMIC BENEFIT

When residents at risk of climate change-related flooding are successfully moved away, there is a benefit, Towe said, not only for those individual families but for local economies as well.

Towe and his colleagues are, at the behest of the Connecticut Institute for Resilience and Climate

Adaptation, finalizing a study that quantifies exactly how much revenue loss can be recouped when residents retreat from homes in floodplains.

“The folks most likely to be taking a buyout are folks that are living in housing that's already being flooded to some degree,” he said. “And it's destined to be flooded more, and that is reflected through lower assessed values or lower improvement values for the difference in the assessment in the land.”

As Bridgeport was attempting, often parkland is created in the place of flood-prone houses, which Towe said can increase the value of a community as well as improve flood control.

“You can certainly get some revenue back from removal of properties, especially if you try to target removal of contiguous property, because you can create essentially a public open space, that is of value,” he said.

“Communities can target certain places, try to remove houses that provided them protection and some sense from storm surge.”

Towe has concluded that removing at-risk homes and replacing them with open space can recoup as much as 14 percent of tax revenue that might otherwise be lost.

“I'm losing this house, I'm losing the tax base, I'm losing that revenue stream, how much of that can I recoup from the increased value around?” he said.

But Towe reiterated that federal policies put already vulnerable, lower income communities at greater risk. FEMA, for example, has a rule stipulating that if a homeowner in a floodplain plans a renovation worth more than 50 percent of the home's value, it needs to be brought to FEMA compliance, which often means putting a home on stilts.

“Elevation's expensive, though, right?” he said. “The well-off can afford to elevate and will undertake that in order to do their renovation, and maybe the less well off, maybe they don't do the renovation they otherwise would like to do to their home.”

Such policies, according to Towe, will have to be reconsidered if communities intend to meet the threat posed by sea level rise.

“We really are going to have to think about these policies with regard to communities that would like to be more capable of adapting to climate change, but are

somehow hindered from doing that, by the very nature of where they live,” he said. ●

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AN ILLEGAL GOLD RUSH IS IGNITING ATTACKS ON INDIGENOUS PEOPLE IN THE AMAZON

Indigenous communities and isolated tribes in Brazil are under threat as the government moves to legalize mining, logging, and industrial farming.

By Scott Wallace

As tensions between illegal gold miners and Indigenous communities erupt into open violence in the Brazilian Amazon, legislators allied with right-wing president Jair Bolsonaro are aggressively pursuing measures aimed at curtailing protections of the territories and rights of Indigenous people.

Since mid-May, prospectors have launched a series of brazen attacks against Yanomami and Munduruku communities in the states of Roraima and Pará respectively.

Indigenous leaders believe their communities are facing the most perilous moment since Brazil returned to democracy in the 1980s, after more than 20 years of military dictatorship. Death threats and intimidation are daily occurrences in some areas, and Munduruku leaders say their people are living in a “state of war.”

Miners and their Indigenous collaborators in the Munduruku Indigenous Territory set fire to the homes of several tribal leaders in late May, an apparent reprisal for a police raid on a gold strike.

Recently, at least eight separate attacks have been reported in the Yanomami Indigenous Territory, including a running gun battle between gold miners and villagers, according to the Hutukara Yanomami Association. In one incident, two Indigenous children drowned in the panic that ensued as miners opened fire

with automatic weapons from speedboats on the Uraricoera River. In another encounter, miners rammed a canoe with eight children aboard. All of them managed to reach shore safely and hide in the brush.

Meanwhile in Brasilia, hardline conservatives in the lower chamber of Brazil's Congress cleared a major hurdle last month in their quest to reshape Brazil's 1988 constitution to allow commercial activity on Indigenous lands.

Law Project 490, known as PL490, would legalize mining, logging, industrial agriculture, and other projects deemed "in the national interest" on Indigenous lands without the consent of local communities. The controversial bill was approved on June 23 by the Constitution and Justice Committee and will now move to the lower house, called the Chamber of Deputies, before heading to the Senate. Conservatives allied with agribusiness—*ruralistas*—together with evangelical fundamentalists, form the core of the voting block that holds majorities in both houses.

The catchall measure would also open the way for legal challenges to the boundaries of Indigenous territories, threatening to reduce the size of some areas and eliminate others altogether. In Brazil, 441 Indigenous territories have been demarcated and officially recognized, 237 more are in intermediate stages of recognition. The largest of Brazil's Indigenous territories are in the rainforest, and they cover one-quarter of the country's Amazon region.

Perhaps most unsettling of all, critics say, the bill would make it possible for the government to review and scale back the boundaries of several territories set aside to protect isolated Indigenous groups, also known as "uncontacted tribes." Field agents from the Indigenous affairs agency, FUNAI, have confirmed the existence of 28 isolated Indigenous groups in Brazil, and there may be as many as 70 more. The controversial legislation would also clear the way to force contact on these highly vulnerable groups for any overriding national interest, even allowing third parties to participate in organized contact teams.

"And who would these third parties be?" says Fabricio Amorim, a 10-year veteran of FUNAI who now works for the Observatory of Human Rights for Isolated and Recently Contacted Indigenous Peoples, a Brazilian

advocacy group. "Missionaries, of course. The PL490 is opening terrain not only for the ruralistas but also for evangelicals who have this extremist view to spread the word of Christ to the isolated tribes."

Since 1987, Brazilian law has forbidden forced contact on isolated tribes, except as a measure of last resort to spare a group from devastating violence or disease. The prohibition is in keeping with the progressive values expressed in the constitution to respect the choice of Indigenous people to practice their traditional ways of life on their ancestral homelands without interference. But the appointment of missionaries to key posts in the Bolsonaro government, including FUNAI, has raised fears of an impending push to contact and evangelize the isolated tribes.

Whether the bill ultimately becomes law in whole or in part will likely depend on Brazil's Supreme Court. The court is taking up a related case having to do with a move supported by the ruralistas that would require tribes to prove they occupied their territory at the time the country's constitution was ratified, on October 5, 1988. This so-called "time-frame thesis" has been drafted into Law Project 490, drawing vehement criticism from Indigenous leaders and rights advocates.

"In the case of isolated tribes, it's impossible to apply the time frame," Amorim says. "You can't prove they were in a given place at the time the constitution was ratified." Many groups are nearly always on the move, Amorim points out, either following traditional migration routes or seeking to escape pressures from outsiders.

Even if this measure stalls in Congress or the courts, Amorim is concerned that Bolsonaro will allow several Land Protection Orders to expire in the months ahead. The orders offer provisional relief from commercial exploitation to seven territories harboring uncontacted tribes. Four of the protection orders will come due later this year or early next. A fifth order that protects isolated Kawahiva nomads in the state of Mato Grosso is in imminent danger of losing its legal status if the time-frame thesis become law. FUNAI agents confirmed the presence of these nomadic people as recently as 1996.

'AN INCITEMENT TO VIOLENCE'

Regardless of the ultimate outcome of PL 490, critics say that the Congressional debate over it has helped legitimize extreme positions that are popular on the frontiers abutting Indigenous lands, leading to more bloodshed and attempts to muscle in on protected territories.

"It's an incitement to violence," says Jeremy Campbell, an anthropologist at George Mason University, in Virginia, who specializes in Indigenous land tenure in Brazil. "This gives the green light for more land invasions. It gives people a permission structure through which to disregard Indigenous rights."

"They want to extinguish our memory, our existence," Alessandra Korap Munduruku told *National Geographic* by phone from her village on the Tapajós River. She had just returned to strife-ridden Munduruku Indigenous Territory after a week in Brasilia, where she joined some 800 Indigenous demonstrators from around the country to protest Law Project 490.

The protesters were greeted by riot police with rubber bullets and tear gas as they approached the Congressional Palace. "They want to erase our history and to erase the Indigenous peoples of Brazil to clear the way for the production of exports," she said.

Citing what they believe to be the complicity of FUNAI in dismantling decades of laws and institutions that have protected their rights and lands, Indigenous protesters in Brasilia issued an open letter on June 16 calling for the removal of FUNAI's Bolsonaro-appointed president, Marcelo Augusto Xavier da Silva.

The letter called Xavier's term the "worst" in the history of FUNAI and said the agency had failed in its duty to protect Indigenous rights in a favor of "shady and private interests from agribusiness, illegal mining and so many other threats that put our existence at risk."

In addition to heading FUNAI, Xavier is also a career Federal Police officer. Since April, he has ordered fellow police agents to investigate several Indigenous leaders and even nine FUNAI employees on accusations that range from "defaming" Brazil's image abroad to seeking to impede construction of a powerline across the Waimori-Atroari Indigenous Territory, in Roraima.

Indigenous leaders allege that Xavier has shifted the agency's mission from protecting tribal populations to persecuting them.

In a written response to questions from *National Geographic*, FUNAI denied any wrongdoing and said it has been working to overcome "decades of failure" brought about by "hidden interests, lack of transparency and a strong presence of non-governmental organizations." Calling itself the "new FUNAI," the agency said its operations seek to "promote the autonomy of indigenous people, who must be, par excellence, the protagonists of their own history." The statement also offered support for a "wide-ranging debate" in Congress over provisions that would alter the constitution and open Indigenous territories to mining, despite the methods used to extract gold in the Amazon that ravage forests and pollute waterways with highly toxic mercury.

In response to an order from the Supreme Court to restore security to the region, federal police officers and army troops, together with agents from FUNAI and the environmental protection institute IBAMA, began to arrive on June 28 in the Yanomami Indigenous Territory, home to some 25,000 people. But observers say it will take a concerted effort with hundreds if not thousands of personnel to dislodge the estimated 10,000 to 20,000 prospectors operating illegally in the area since 2019. It's not clear to anyone that the government has the will for such an undertaking.

"The combination of greed and sense of impunity are behind the new gold rush in the territory," says French anthropologist Bruce Albert, who has worked with the Yanomami since 1975 and directs research at the Institut de Recherche pour le Développement in Paris.

Far from being a cottage industry, Albert says, today's mining operations are "mechanized and capitalized criminal enterprises capable of mobilizing armed groups in an effort to break the resistance of the Yanomami people." ●

INTERNATIONAL CLIMATE REPORT FELT IN CONNECTICUT

By Sten Spinella

Connecticut, like the rest of the world, is reckoning with the Intergovernmental Panel on Climate Change's report detailing a bleak future for humankind and the environment, barring a concerted effort to change course.

The report, which warns of wildfires, droughts, rising sea levels, heat waves and more frequent severe weather events, outlined in depth what climate scientists already knew, experts and advocates say. Anji Seth, a professor and the interim head of the geology department at the University of Connecticut in Storrs, did point out a significant departure from past reports.

"Some of the key outcomes of the report are that there's really no doubt anymore that humans are the cause of warming. They're using this term, 'unequivocal,'" Seth said. "In past reports that term was reserved for the fact that earth is warming. The earlier report said the warming is 'unequivocal' and the human cause is likely or very likely. Now there is so much more evidence and near certainty about this that they can use the term 'unequivocal' regarding the human cause of the warming."

She added that the scientific community has been trying to educate the public about warming and climate change for the last 30 years.

"We have known that humans are the cause of climate change since 1995, and we have been very clear that CO2 is increasing and that is causing the warming," Seth said. "This new report also tells us if we stop emitting CO2, temperatures will stop increasing. It's that simple. It really is about the fossil carbon we're putting in the atmosphere. We know if we stop doing that, temperatures will stop increasing."

Terri Eickel, the director of development for Avalonia Land Conservancy based in Stonington, said she found the report "extremely motivating." Avalonia is "a land

trust dedicated to conservation through the acquisition of open space," according to its website.

"Some folks I work with on various levels kind of wanted to just lie down on the floor for a day or two," Eickel said. "Nothing in it is a big surprise, but each time you see it printed by a large, trusted, peer-reviewed scientific body, it's definitely sobering."

Seth and other researchers worked on the Connecticut Physical Climate Assessment report, released in 2019, that reaches many of the same conclusions of the IPCC report but focuses on Connecticut. The state is looking at rising air temperatures, less snow falling in the winter, more precipitation in certain areas, a longer growing season and rising sea levels.

Juliana Barrett, extension educator for the Connecticut Sea Grant program at UConn Avery Point, also said the IPCC report "is nothing we don't already know, but what it does is emphasize some of the impacts that will be felt for hundreds if not thousands of years."

"I think it's just a push to act, and southeastern Connecticut is a very active community," Barrett said. "Many of the areas there have had vulnerability assessments, action plans and the municipalities are working on what they can do in terms of planning, regulations, getting out of flood plains, or decreasing building in floodplains, as well as taking sea level rise into account in any new development that could be impacted."

For example, as part of the UConn report, researchers studied New London in an attempt to "mitigate negative impacts of sea level rise while spurring economic growth along South Water Street." In looking at Long Island Sound tide gauge data, researchers found that "The preliminary data on sea level rise ... indicates that the 1%, or 100-year storm events will likely be 20 inches higher in 2050. Trends ... estimate that approximately 68 buildings along the Thames River will be vulnerable to flooding in 2050. This is a significant increase when compared to current 100 year flood projections, which estimate only 12 buildings in danger."

Seth said Connecticut's average temperatures have already increased more than the global average — about 2 degrees Fahrenheit. She added that projections show an increase in extreme rainfall, or, conversely, the potential for more drought in the summertime.

Barrett and Seth both said Connecticut could improve in eliminating fossil fuel emissions. Barrett pointed to the infrastructure bill, currently before the U.S. House of Representatives, and how it could bolster public transportation in the state. And Seth brought up the Transportation Climate Initiative, or TCI, a plan supported by Gov. Ned Lamont that ultimately was not passed by the state legislature in last year's regular session.

Originally in the state budget, the TCI was removed following backlash, mostly from Republicans, because starting in 2023 the program is projected to drive up gas prices by about 5 cents per gallon. The measure is meant to reduce the state's carbon emissions by capping carbon pollution from transportation. Money generated from gas suppliers buying carbon credits would then go to certain Connecticut communities affected by pollution, as well as more environmentally friendly transportation initiatives.

The state legislature is expected to hold a special session this month, where the TCI may come up.

"The state is pretty progressive and there have been a number of legislative efforts to limit CO2 emissions, but (the TCI) failed to get enough support primarily because of misinformation by the media," Seth said. "The TCI didn't make it through because people were calling it a gas tax. We need to do a better job of communicating to people and helping them understand, this is too urgent a problem to be playing these kinds of games."

In responding to the climate report, Lamont and state Department of Energy and Environmental Protection Commissioner Katie Dykes issued a joint statement in August, in which they urged implementation of the TCI.

"Transportation remains the largest source of greenhouse gas emissions and air pollution in Connecticut and across the United States," their statement reads. "In the long term, enacting programs like the Transportation and Climate Initiative will be critical to drive down emissions in our state and region, create green jobs for a thriving economy, and clean our air, making healthier and safer communities for all."

Eickel emphasized the importance of the TCI and said she expects it to be voted on in special session. She said it would be one of the most progressive climate policies in the state. Connecticut would participate with

Massachusetts and Rhode Island, if enacted in all three states.

"It's a regional approach to decreasing our carbon emissions, producing revenue for areas overburdened by air pollution. The positive health impacts will be significant," Eickel said. "The state adopted our climate goals of reducing 45% of our greenhouse gases by 2030, which is not that far away. We can't abandon legislation that will move us into that realm. Especially participating as a regional partner, we have to make a commitment to do that, we can't back away." ●

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NEW VIDEO GAME CONFRONTS SLAVERY'S LEGACY THROUGH A HISTORICAL MYSTERY

"Blackhaven" finds a fictional intern working to uncover a colonial estate's hidden history while facing present-day racism

By Livia Gershon

A young woman starts her summer internship at a historic site dating to the time of the American Revolution, only to begin turning up violent pieces of the estate's history that have been intentionally hidden from the public. That's the premise behind the first-person video game "Blackhaven," out now from Historiated Games.

Founded by James Coltrain, a historian and expert on game design at the University of Connecticut, Historiated Games describes itself as a "historian founded studio making story-driven games." As E.L. Meszaros reports for CBR, the company's first game, "Blackhaven," immerses players in the realistic—albeit fictional—landscape of Blackhaven Hall Historical Society, a ruined colonial estate restored as a museum. The mansion once belonged to Thomas Harwood, who, in the world of the game, was an American Founding Father.

As Kendra Turner, a sophomore at a Historically Black College and University (HBCU) and the society's newest intern, players complete tasks including testing a guided tour and scanning documents.

Gradually, they discover clues not only to the history of slavery at Blackhaven but also to modern racism. Kendra digs out disturbing documents from the estate's archives and discovers emails from her boss showing that the historical society resented hiring someone from an HBCU but did so to get credit for diversity.

"I could relate a lot to Kendra's experience," says Tia Alphonse, a graduate student at the University of Missouri who worked on Blackhaven's script as an undergraduate at Xavier University of Louisiana, to Connecticut Public Radio (CPR)'s Patrick Skahill.

"A lot of times when you enter these spaces that don't reflect your identity ... if someone has an issue with you, you're trying to figure out whether or not this issue is related to me personally or if it's related to racism, or sexism or some other aspect of my identity."

She adds, "You have to go through this, almost like investigative work, to figure out whether or not you're the problem, or ... they're the problem."

Alphonse and other students worked on the game with Coltrain and Xavier communications scholar Shearon Roberts. As Roberts tells CPR, the game can offer a jumping-off point for players interested in exploring real historical events and the way they're commemorated.

"The video game genre is something you can return to, that you can customize. That you can stop and dwell on," she says. "You can encounter a document and then you can pause and you can go Google and do your research about it and say, 'Is this real? Did something like this happen in the real world?'"

Reviewing the game for Pfangirl.com, Noelle Adams notes that the game features reproduction of real artifacts and architecture, along with documents based closely on real ones. She writes that the character of Kendra, voiced by Darby Farr, prevents the historical material from coming across as dry. "The combination of sharp, contemporary writing and Farr's natural performance create the effect of sitting in a college lecture next to a likeable smartass who's giving a running commentary on the class," Adams explains. Coltrain tells CPR that he hopes historians will become

more engaged with video games, which provide an entry point into history for many people today.

"There's somebody who suggested that 'Call of Duty,' the World War II series, might be the most influential interpretation of World War II in the last 20 years based on the amount of people who have consumed it," he says. "Historians regularly are involved with things like movies and museums and things like Hamilton ... but they haven't done a lot with video games."

Per a statement from the University of Connecticut, Historiated is also developing a related game, "Cassius," set for release next year. Set in 1781, the first-person experience will allow players to explore Blackhaven Hall as it is evacuated at the height of the American Revolution.

In the meantime, "Blackhaven" is available on Steam as a free download for PCs. "I want ['Blackhaven'] to stand on its own as a piece of narrative entertainment, but I also want it to be something that illuminates some themes about history and also is as faithful as possible ... a game that you want to play," says Coltrain in the statement. "I'm going towards a high degree of historical accuracy, but total historical accuracy is just not always going to be possible." ●

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ARCTIC OCEAN FOSSILS SUGGEST CLIMATE CHANGE MIGHT NOT BE SO GREAT FOR PLANKTON

Some scientists have predicted shrinking sea ice and more light reaching the Arctic Ocean's surface could mean more plankton. New research suggests otherwise.

By Abrar Al-Heeti

Climate change is warming the Arctic Ocean and causing sea ice to shrink. Some of these changes will be irreversible but scientists have predicted the lack of sea

ice could see more light reach the ocean's surface, unwittingly leading to a boon in plankton. The tiny organisms sit at the bottom of the food web and are critical for fish and other sea life to feed on.

In 2020, huge blooms of one type of plankton were spotted in the open Arctic. Researchers have recorded an increase in plankton productivity and shown climate change is providing a lot more space to expand into as sea ice diminishes. Sounds good? It might not be.

According to a study published in Nature Geoscience on Monday, shrinking sea ice may spell doom for plankton.

A team of scientists led by Princeton University and the Max Planck Institute for Chemistry used fossilized plankton and ice cores to examine the history of sources and supply rates of nitrogen, a vital nutrient for plankton, to the western and central open Arctic Ocean.

Their research suggests with global warming, these waters will have less nitrogen -- negatively affecting plankton productivity.

"Looking at the Arctic Ocean from space, it's difficult to see water at all, as much of the Arctic Ocean is covered by a layer of sea ice," said Jesse Farmer, lead author of the study, geoscientist at Princeton University and visiting postdoctoral fellow at the Max Planck Institute for Chemistry, in a statement. That sea ice naturally expands in the winter and contracts in the summer. In recent decades, global warming has led to a rapid drop in summer sea ice coverage, with that ice cover now being around half of what it was in 1979.

While melting sea ice should mean photosynthesizing plankton making up the base of Arctic food webs could reap the benefits of having more light, there's a catch, according to contributing author Julie Granger, an associate professor of marine sciences at the University of Connecticut.

"These plankton also need nutrients to grow and nutrients are only abundant deeper in the Arctic Ocean, just beyond the reach of the plankton," Granger said. Whether plankton can get those nutrients is a matter of how "stratified" the upper ocean is, or how much it's separated into layers. The upper 600 feet of the ocean is made up of layers of water with varying densities, based on temperature and saltiness.

"When the upper ocean is strongly stratified, with very light water floating on top of dense deep water, the

supply of nutrients to the sunlit surface is slow," Farmer said.

New research found the amount of nitrogen in the Arctic has changed since the last ice age, showing the history of stratification in the Arctic Ocean. The Arctic is where the Pacific and Atlantic oceans meet. Fresh Pacific water flows over the saltier water from the Atlantic, which leaves the western Arctic packed with nitrogen flowing in from the Pacific.

It wasn't always like that.

"During the last ice age, when the growth of ice sheets lowered global sea level, the Bering Strait didn't exist," Daniel Sigman, professor of geological and geophysical sciences at Princeton, said in a statement. Back then, the Bering Strait was instead the Bering Land Bridge, which connected Asia and North America and allowed humans to migrate to the Americas.

At the end of the ice age 11,500 years ago, when ice sheets melted and sea levels went up, the Bering Land Bridge was submerged, allowing nitrogen from the Pacific to creep into the open western Arctic basin.

During the last ice age and under colder climate, stratification in the Arctic was weak. After the ice age, central Arctic stratification became stronger, peaking during a time of naturally warmer Arctic summer temperatures some 10,000 and 6,000 years ago, a time known as the Holocene Thermal Maximum. Since then, stratification in the central Arctic has grown weaker, which has allowed the deeper nitrogen to move up towards the surface, where it can be used by plankton.

The climate crisis is seeing warmer temperatures in the Arctic, returning it to a climate similar to the Holocene Thermal Maximum. Although some scientists have suggested increasing amounts of sunlight touching the ocean could make Arctic plankton more productive, scientists from Monday's study found this isn't likely because of nitrogen availability in open regions of the Arctic. Low nitrogen means poor plankton productivity and hurts one of the foundational organisms in the ecosystems food web.

"Given our data, a rise in open Arctic productivity seems unlikely," Farmer said. "The best hope for a future rise in Arctic productivity is probably in the Arctic's coastal waters." ●

THE QUEST FOR NON-HORMONAL BIRTH CONTROL

Scientists know that many women want hormone-free birth control, but it didn't seem possible — until now.

By Jessica Brown

The introduction of the contraceptive pill in the 1960s spurred a landmark moment for women, liberating many from the home and propelling them into the world. But this excitement overshadowed the side effects and hazards associated with the pill, which we now know may include a slightly increased risk of breast cancer.

“A lot of women are unaware of the cancer risk associated with hormonal birth control because the advent of the pill freed up the lives of women to enter the workforce more effectively,” says Beverly Strassmann, a human evolutionary biologist at the University of Michigan.

When radically altering the body with synthetic hormones, you can't assume there won't be side effects, she says. But the field hasn't made significant progress, partly because contraceptives have provided women with tangible benefits.

Sixty years on, pharmaceutical companies are still “resting on their laurels” and need to better evaluate the association between hormonal birth control and cancer, she adds.

Research has also linked the pill to depression, decreased sexual desire, anxiety and an altered ability to form emotional memories. Most physicians, however, still don't closely follow research investigating the links between hormonal birth control and its psychological side effects, says evolutionary psychologist Sarah Hill, author of *How the Pill Changes Everything: Your Brain on Birth Control*.

“Most medication doesn't look at the full spectrum of side effects in the way people experience the world; it's not even in physicians' peripheral vision,” Hill says.

But women want the next birth control revolution; younger women especially seek non-hormonal options, Hill says. “A lot of women aren't being served, and many are on the pill even though they don't love it — their standards are low because there's so few good options,” she says.

In recent years, contraception apps have attracted a rise in users, which may suggest that many women no longer tolerate the impacts of hormonal birth control on their bodies. But these apps have faced criticism over their efficacy.

A NEW KIND OF PILL

Another possibility: a non-hormonal pill. Now, University of Connecticut physiologist and geneticist Jianjun Sun is wading through the unknowns to formulate it.

“We know that, in humans, the ovulation process is triggered by a hormone surge, but how the egg is released is very precise; the menstrual cycle is very tightly controlled and there are a lot of unknowns in this area,” he says.

Sun does know that when a person ovulates, an egg that's contained within a follicle bursts out of the ovary and sets off down the fallopian tube, where it can be fertilized. He's hoping to formulate a drug that stops the follicle from rupturing and releasing the egg.

Shutting off ovulation isn't a new concept — hormonal contraception does this by tricking the body into thinking users aren't pregnant. But he seeks a new way to halt egg release without the use of synthetic hormones.

Crucially, Sun has devised a way to analyze different compounds without relying on human subjects (which would complicate the process). He realized that fruit flies ovulate in a similar way to people, and the fly's ovulation process resembles that within mice.

As this research took off, the Gates Foundation had begun supporting scientists developing non-hormonal contraceptives. The organization has funded Sun to test compounds on flies.

Now, Sun is screening up to 500 compounds daily to see which ones prevent follicles from rupturing and releasing eggs. “The Gates are very excited now. They’re trying to get us to find the target, then we can study this target using genetic tools,” he says.

Researchers could test the drug in humans eventually, Sun says. Unlike hormonal pills, users wouldn’t need to take it daily. To inhibit ovulation, you only need to take it for a week or so before the process begins.

While this sounds tempting, many people don’t know when exactly they ovulate — and only 10 to 15 percent of women experience 28-day cycles. And because the drug concept is so new, researchers aren’t sure what dosing might look like. “It’s still hypothetical in terms of how to use contraceptives targeting ovulation, since there’s no products on the market,” Sun says.

A DEARTH OF RESEARCH

Despite the many unknowns, experts seem receptive to any new research in hormonal birth control alternatives. In recent years, few studies have taken on this challenge.

Hormonal contraceptives dominate at a time when, researchers argue, scientific and technological advances bring unprecedented opportunities for new drugs across medical fields.

If Sun’s research is fruitful, it could attract more funding for other researchers working on these alternatives, says Bethan Swift, a PhD student at the University of Oxford who studies the epidemiology of women’s health. “One big barrier to developing new contraception is that existing options work,” Swift says, “So there’s little demand from the pharmaceutical industry to put money into creating new compounds.”

This shortage of funds places significant pressure on Sun; the Gates Foundation hopes that at least one drug will hit the market by 2026, he says. But the bar for birth control approval is uniquely high. Because it isn’t meant to alleviate an illness, possible side effects may not be worth the trade-off versus, for example, cancer treatments. It will probably take between five and 10 years before a new drug is available, Sun says.

“Developing new contraception isn’t easy because they’re going to healthy women, unlike other drugs,

where it’s more accepted that there will be side effects,” Sun says.

The final drug will likely cause some side effects, but fewer than hormone-based contraceptives, he notes. However, Hill is concerned that the end product could still affect the body’s natural hormone levels.

Our bodies produce most sex hormones via ovulation, and high levels of estrogen propel monthly egg maturation. After an egg is released, the empty follicle releases progesterone — so levels would fall fairly low if you prevent ovulation, she says.

“Stopping ovulation sounds perfect, but if you understand that’s how the body makes hormones, you’d realize it’s not a panacea.” ●

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HOW SHOULD THE FED DEAL WITH CLIMATE CHANGE?

By Neil Irwin

The climate crisis is at high risk of becoming an economic crisis.

That is an increasingly widespread view among leading economic thinkers — that a range of economic and financial problems could result from a warming planet and humanity’s efforts to deal with it. But if you believe that to be true, what should the United States’ economist-in-chief do about it?

That question has taken new urgency as President Biden weighs whether to reappoint Jerome Powell to another term leading the Federal Reserve or choose someone else.

Climate activists and others on the left have argued that Mr. Powell should be replaced by someone with stronger credentials as a climate hawk. Demonstrators backing this cause were planning to protest at an annual Fed symposium in Jackson Hole, Wyo., starting Thursday, but the event was made online-only at the last minute because of a rise in coronavirus

cases. Among other things, they want the Fed to use its regulatory powers to throttle the flow of bank lending to carbon-producing industries.

At the same time, some Republicans are assailing the Fed for mere research efforts involving climate. It is clear there would be a huge outcry on the right if a new Fed chair were to take an activist stance in trying to limit the availability of capital in energy-extraction businesses.

So far, Mr. Powell and other leaders at the central bank have taken a middle ground. They've committed to studying the ways global warming will affect the economy and the financial system, and they're factoring those conclusions into their usual jobs of guiding the economy and regulating banks — but not trying to manage how loans and resources are allocated.

Arguably, one of the more important things the Fed can do to help fight climate change is to excel at its primary job: maintaining a stable, strong economy. Consider some surprising public opinion data.

Since 1989, Gallup has polled Americans about whether climate change worried them personally. The net share of people who have expressed concern — those who have said they worry about climate a “fair amount” or a “great deal” versus those who have worried “only a little” or “not at all” — offers a sense of how seriously Americans take the threat.

The net share of people worried about climate change reached its peak not in recent years, when the damaging effects have become more visible. The peak was in April 2000, when the share of people worried about the climate was 45 percentage points higher than the share not worried. That was also one of the best months for the U.S. economy in decades, near the peak of the late 1990s boom, with unemployment a mere 3.8 percent.

Two of the times when climate worry in the survey hit a low were in 2010 and 2011, in the aftermath of the global financial crisis, when the net shares of those worried versus not worried were only four and three percentage points.

Using a broader range of evidence from both the United States and Europe, two political scientists at the University of Connecticut, Lyle Scruggs and Salil Benegal, found that a decline in climate concern in that

period was driven significantly by worse economic conditions, which increased worry about more immediate issues. In times of scarcity, people tend to think less of policies with long-term payoffs.

“The state of the economy affects people’s sensitivity to the future versus the present,” Professor Scruggs said. “Historically climate change has fallen into the same camp as a lot of other environmental issues, where people’s answers tend to wax and wane with the economy.”

If a central bank can achieve consistent prosperity, this research suggests, it may change some political dynamics on aggressive climate action. Prosperity could support branches of government that have more explicit responsibility for curtailing greenhouse gases, building out clean energy capacity, or helping communities adapt to more extreme weather.

Not everyone who studies public opinion on climate agrees.

Anthony Leiserowitz, director of the Yale Program on Climate Change Communication, attributes the decline in concern about climate change in the early 2010s not to the weak economy, but to widening political polarization and a pivot of conservative media toward climate change denialism.

“What we saw was a symbiotic relationship between conservative media, conservative elected officials and the conservative public,” he said. “That drove the shift. It wasn’t the economy.”

A paper published this summer by Michael T. Kiley, a Fed staff member, analyzed how temperature variations affect economic performance. It concluded that climate change may not change the typical rate of growth in the economy over time but could make severe recessions more common. A major crop failure, for example, would lower G.D.P. directly and could simultaneously create economic ripple effects such as bank failures.

And Lael Brainard, a Fed governor and potential Biden appointee to become the next chair, has emphasized that the unpredictable nature of climate change could make obsolete the historical models on which economic policy is based.

“Unlike episodic or transitory shocks, climate change is an ongoing, cumulative process, which is expected to produce a series of shocks,” she said in a March speech.

“Over time, these shocks can change the statistical time-series properties of economic variables, making forecasting based on historical experience more difficult and less reliable.”

If Ms. Brainard is correct, it raises a dispiriting possibility: As the planet gets hotter, it could make it harder to keep the economy on an even keel. But the worse the economy performs, the more toxic and dysfunctional climate politics may become. ●

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DO TELENOVELAS WIN EMMY AWARDS?

By Lou Haviland

Wherever Spanish is spoken throughout the world, you can be sure a telenovela can be found on small screens, whether in Mexico, Spain, and all throughout Latin America. Even non-Spanish-speaking countries enjoy telenovelas, usually dubbed over in their own language. The serialized programs, typically involving a victimized character, a villain, and a love story, are also hugely popular in the United States, which millions of Hispanics call home.

Here’s more on the growing demand for telenovelas and how the Emmys address the genre.

WHY TELENOVELAS ARE SO POPULAR

Every viewer of the genre may provide a unique answer to the question of the popularity of telenovelas, but according to PBS in a conversation with University of Connecticut communication sciences professor Diana Rios, it’s all about the themes of familial love, romantic love, and good over evil. Telenovelas also keep families connecting.

“It’s a conversation piece,” Rios told PBS. “Latinos in the U.S. can talk about shows with people back in Latin America. ... I’ve had conversations with friends and they’ll say, ‘Oh, look at that. One of my relatives had something like that happen to her.’ [Telenovelas] are here to stay, and there’s just going to be more of them.

But they do have an impact and they are important to the Latino community.”

As popular as the Brazilian and Mexican telenovelas have been, in recent years they have a new competitor: Turkish telenovelas, as Univision told Variety recently.

“Univision’s UniMas network aired its first Turkish novela “Entre Dos Amores” (In Between) in 2018,” Univision’s president of entertainment said. “In 2019, Univision premiered international hit, “Amor Eterno,” which brought a unique audience to Univision and diversified our portfolio, delivering outstanding ratings and positioning Univision network No 1 in its timeslot. Since its premiere, that novela doubled its audience and registered peaks of over 900,000 viewers.”

TELENOVELAS COMPETE IN THE INTERNATIONAL EMMY AWARD CEREMONY

Because telenovelas are produced outside of the United States and in languages other than English, they have been represented at the International Emmy Awards by the International Academy of Television Arts and Sciences. Until 2007, telenovelas received nominations in the best drama series category of the international competition. Then, in 2008, the genre finally received its own category, International Emmy Award for Best Telenovela.

In 2011, the Telemundo telenovela La Reina Del Sur attempted (figuratively) to scale the wall between the international Emmys and the stateside Primetime version. At that time, the network’s president of entertainment Joshua Mintz explained to The Los Angeles Times, “I can imagine that when they get the ratings every day and they see the numbers that this show and other Hispanic TV are delivering, they see the power, the reality. Whether they accept that fact is different. But the numbers are there, there’s no denying that.”

Unfortunately, La Reina Del Sur, which starred Kate Castillo and would pull in even more audiences on Netflix, was not nominated for a Primetime Emmy award. It did win an International Emmy in 2020 for Non-English Language U.S. Primetime Program, in a tie with the 20th Annual Latin GRAMMYS broadcast.

LAST YEAR'S BIG WINNER

Although nominees for the 2021 International Emmy Award for Best Telenovela have not yet been announced, the ceremony is scheduled for November 22, 2021 in New York City.

The telenovela that took home the trophy for the category in 2020 was Brazil's popular "Órfãos Da Terra (Orphans of a Nation)." ●

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'TOXIC SOUP' ALGAE WARNED OF ANCIENT EXTINCTION EVENT – AND IT'S HAPPENING AGAIN NOW

By Rob Waugh

Fifty-two million years ago lakes and rivers turned into 'toxic soup' - and warning signs similar to those that occurred then are now appearing today.

The end-Permian mass extinction event – the worst in Earth's history – saw toxic microbial blooms seething in rivers, delaying the recovery of animal life by millions of years, fossil evidence has revealed.

Scientists at University of Connecticut said the toxic soup could also be found in the fossil records of other related mass extinctions in Earth's history.

Today, freshwater microbial blooms have been on the rise, the researchers warned.

Professor Tracy Frank said: "We're seeing more and more toxic algae blooms in lakes and in shallow marine environments that's related to increases in temperature and changes in plant communities which are leading to increases in nutrient contributions to freshwater environments.

"So, a lot of parallels to today. The volcanism was a source of CO₂ in the past but we know that the rate of CO₂ input that was seen back then was similar to the

rate of CO₂ increases we're seeing today because of anthropogenic effects.

"We can get a sense of how much climate has changed in the past, what the extremes are, how fast it can change, what the causes of climate change are and that gives us a nice backdrop for understanding what's happening today."

According to this year's report by the Intergovernmental Panel on Climate Change (IPCC), the influence of humans on the changing climate is "unequivocal", creating conditions that favour the spread of these warmth-loving microbes.

In combination with an influx of nutrients from water pollution, mostly from agriculture and deforestation, this has led to a sharp increase in toxic blooms.

This has resulted in mass fish die-offs, severe human and livestock health effects, and an annual cost measurable in billions of dollars.

The three main ingredients for the toxic soup are accelerated greenhouse gas emissions, high temperatures, and abundant nutrients.

During the end-Permian mass extinction, the volcanic eruptions provided the first two, while sudden deforestation caused the third.

When the trees were wiped out, the soils bled into the rivers and lakes, providing all the nutrients that the microbes would need.

In a healthy ecosystem, microscopic algae and cyanobacteria provide oxygen to aquatic animals as a waste product of their photosynthesis.

But when their numbers get out of control, these microbes deplete free oxygen, and even release toxins into the water.

By studying the fossil, sediment and chemical records of rocks near Sydney in Australia, the researchers discovered that several pulses of bloom events had occurred soon after the first volcanic rumblings of the end-Permian mass extinction.

The freshwater systems then seethed with algae and bacteria, delaying the recovery of animals for perhaps millions of years.

Frank said: "We are trying to understand what conditions these plants were living in, for instance were

they lake deposits versus river deposits? Then what can we determine details about the salinity and temperatures of the waters, those details come from the geochemistry."

"The end-Permian is one of the best places to look for parallels with what's happening now," said geologist Chris Fielding from University of Connecticut.

"The scary thing is we are used to thinking in terms of timescales of years, maybe tens of years, if we get really adventurous. The end-Permian mass extinction event took four million years to recover from. That's sobering.

"The other big parallel is that the increase in temperature at the end of the Permian coincided with massive increases in forest fires. One of the things that that destroyed whole ecosystems was fire, and we're seeing that right now in places like California.

"One wonders what the longer-term consequences of events like that as they are becoming more and more widespread." ●

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FEW BLACK WOMEN HAVE BEEN ELECTED TO TOP LOCAL OFFICE ACROSS CONNECTICUT, BUT THIS YEAR A HANDFUL OF CANDIDATES HOPE CHANGE IS COMING

By Daniela Altimari

Aigné Goldsby had long pondered a run for political office. But it wasn't until the murder of a Black man by police in Minnesota that she decided to launch her campaign for mayor of Cromwell.

"I thought about it, and I decided, 'This is it. This is the time,'" said Goldsby, a 32-year-old attorney whose own father was murdered during a drug deal in Philadelphia when she was an infant. "After George Floyd, I felt like I

needed to get more involved. ... I believe everybody's voice deserves to be heard."

Goldsby is part of a small but growing sorority of Black women entering local politics. The list of Black Democratic women on the November ballot includes Suzette DeBeatham-Brown of Bloomfield, who was born in Jamaica and is the state's only Black female mayor, and Immacula Cann, a Black woman running for mayor of Startford.

On the Democratic side, Black women also are running in Windsor and West Hartford, among other towns, while Republicans have nominated two Black women — Kelly Lierzer and Jacqueline Crespan — for seats on the Board of Directors in Manchester.

"We're seeing a lot of historic firsts," said Evelyn M. Simien, a professor of political science at the University of Connecticut and the author of a book on barrier-breaking candidates. "Folks who might have been on the periphery of politics are coming to the fore and actively participating. They're not simple casting a ballot but working campaigns, donating money ... and ultimately, running for elective office."

FEW CANDIDATES

Yet the pace of change remains frustratingly slow, said Mae Flexer, the executive director of Emerge Connecticut, which recruits and trains Democratic women to run for political office.

Some pictures are created, by accident or on purpose, that will make you look twice. The first glance made you confused and the second look helps you understand what is really...

"We've been politely waiting for there to be more equity in representation and, at some point ... politeness is off the table," said Flexer, a state senator from Killingly. "We've just got to take our turn."

Representation at the local level is important because municipal government serves as a pipeline for candidates for higher office. A failure to develop a diverse bench of Black women serving on city councils and boards of selectmen and as mayors will have repercussions for the state legislative and Congress races in the future.

In 1987, Carrie Saxon Perry became the first African American woman to be elected as mayor of a major

New England city. Since then, gains for Black females have largely stalled. In Bridgeport, Stamford, New Haven and Hartford — all cities with sizable Black populations — white men retain a grip on the top office, although women of color are represented on councils and other governing municipal bodies.

While the gender balance could shift slightly in November — a white woman, Caroline Simmons, won the Democratic primary for mayor of Stamford — there are no Black women among major party candidates for chief elective office in these urban centers. (In New Britain, the state's eighth largest city, Alicia Hernandez Strong, an Afro-Latina organizer and activist who co-founded the city's racial justice coalition, lost the Democratic mayoral primary to state Rep. Bobby Sanchez.)

The dearth of Black women in politics is not unique to Connecticut: In Boston, two Black female candidates for mayor failed last week to earn enough votes to run in the general election. And even with gains in Congress, and Vice President Kamala Harris' win in November, no Black woman has ever served as a governor and just two, both of them Democrats, have been elected to the U.S. Senate.

BLACK AND REPUBLICAN

On the Republican side, the lack of representation is even more striking. Only one Black female member of the GOP has served in Congress: former U.S. Rep. Mia Love of Utah (who grew up in Norwalk and was educated at the University of Hartford.) There are no Black Republican women currently serving in the state legislature or in the top elective office at the local level.

Manchester Republicans are hoping to shift that dynamic, nominating two Black women for seats on the Board of Directors, the town's chief legislative body.

"Having a diverse slate makes sure everyone's voice is heard," said aerospace engineer Kelly Lierzer, one of the candidates recruited by the party to run. "Everyone should have a seat at the table. I was excited to have someone reach out and tell me, 'your voice matters.'"

Lierzer, 39, said her candidacy counters the perception that every Republican is "an older white gentleman."

Another Republican candidate for the Board of Directors, Jacqueline Crespan, said she decided to run

after watching from the sidelines for several years. "I was calling candidates and volunteering, but then I thought, instead of just giving my opinion, I should be running for office," she said.

Crespan, who is 42, spent her youth in Uganda and lived in Switzerland, England and Chicago before settling in Connecticut more than 25 years ago.

"I was born under a dictatorship in east Africa, and I saw war firsthand," said Crespan, who studied computer science and is now a landlord and entrepreneur. Those harrowing experiences early in life shaped her political outlook and led her to prioritize public safety, she said.

Some people have questioned her decision, as a Black woman, to join the Republican Party, Crespan said. "When I tell people I'm running on the GOP ticket, they say, 'Oh, you're running with racists?'"

[Politics] A cancer patient was sent to prison for DUI. Two months later, he was dead from COVID after being transferred between four correctional facilities in Connecticut. »

Crespan rejects such thinking and says there is diversity in thought among both parties.

"I want young women — and men — who look like me to know that they don't have to be placed in a box," Crespan said. "I don't want a young lady or a young gentleman to think that just because of the color of their skin there's only one party that they can choose from."

CHALLENGING THE STATUS QUO

The Democratic Party's platform commits the party to "embed racial justice in every element of our governing agenda." But Sonya Jelks, the majority leader of the city council in Meriden, said she initially got pushback from colleagues, including her fellow Democrats, when she sought to highlight racial inequities after joining the council in 2015.

"People were saying, 'Race isn't an issue. Why are we making everything racial?'" Jelks recalled. "Even within our own caucus, we had people who were not necessarily championing racial or social equity for communities of color."

Jelks said she and other Black and Latina women on the council have promoted racial equity, such as declaring

racism a public health hazard and improving perceptions of largely minority downtown Meriden.

“Here we are now in 2021, and we have a whole racial equity agenda, and that would have never happened if we didn’t have the council member diversity we have right now,” said Jelks, who isn’t on the November ballot (her term doesn’t expire for two more years). “It truly makes a difference in terms of who serves. You really need women and mothers and working class people and business owners to be truly representative of the people.”

Jelks’ journey to elective office is typical of that of many Black female candidates who often enter the political sphere through community organizations and school or neighborhood groups. “Prior to my being asked to run, I had never participated in a town committee or in any of the institutions that generate candidates who run for office,” she said.

Instead, Jelks started becoming involved in her early 40s, participating in parent-leadership training programs. She is only the second Black woman to serve on the Meriden City Council.

Aigné Goldsby is a generation younger than Jelks and has taken a different path into local politics. She grew up in eastern Pennsylvania and came to Connecticut to attend UConn law school. Now an attorney in private practice, she has served as president of the George W. Crawford Black Bar Association in Connecticut and is a member of the association’s diversity & inclusion committee.

Cromwell is 86.5% white, according to a 2019 estimate by the U.S. Census Bureau, but Goldsby said her message of inclusion and change resonates with voters of all backgrounds.

“I’m someone who is not OK with the status quo,” she said. “I want us to be the best town we can be.” ●

UConn Filmmaker’s Documentary Telling Story of Connecticut Immigrant Family Stricken with COVID at Baby’s Birth Earns Emmy Nominations

By Christopher Arnott

Oscar Guerra, a human rights activist and documentary filmmaker who teaches at the University of Connecticut at Stamford, is nominated for two national Emmy Awards this week.

Guerra’s film “Love, Life and the Virus,” which tells the story of a Guatemalan woman hospitalized with COVID-19 while she is pregnant with her second child and her family. With her husband and son also ill with COVID, the local community comes to the family’s aid, including the son’s teacher who takes on the responsibility of caring for the newborn baby until the family is able to.

“Love, Life and the Virus,” which aired on PBS as an episode of Frontline, is nominated in two categories: Outstanding Feature Story in a Newsmagazine and Best Story in a Newsmagazine.

The winners of the 42nd annual News and Documentary Emmy Awards will be announced Sept. 28 and 29.

Guerra specializes in documentaries that advocate social change, with an emphasis on Latino and immigration themes.

Guerra is an assistant professor of film and video in the Digital Media and Design Department at UConn Stamford, where he’s also involved with UConn’s Human Rights Institute and its Dodd Human Rights Impact campaign. He joined the faculty there in 2019.

Guerra was born in Mexico and has worked in the U.S. for the past decade. In a statement released by UConn Monday morning, Guerra notes that his own child was born during the Trump Administration’s Zero Tolerance immigration policy.

“Can you imagine being separated from your kids, just like that, because you’re seeking asylum?” he says. “Maybe you’re fortunate enough that it has never happened and is never going to happen to you, but what if? What would you do for your kids? I’m not trying to put any judgment or anything here, it’s just shedding light on something, it’s just starting that conversation, but this is going to be a very powerful film.”

In a future collaboration with Frontline, Guerra plans a multimedia project about the reunification of families separated at the U.S. border. Guerra has described the project as “a comprehensive examination of the Zero Tolerance policy and its aftermath. What is the Biden Administration doing about it now? Are we going to forget about it? Are we going to learn from the past?”

“I realized that it was almost my moral responsibility to use my talents and my field to give back to my community,” he says. “You can start reframing the Latino immigrant experience. What we see in mainstream media, it’s not an accurate reality of who we are. Our reality is very complex and rich. Media has a lot of power, and when we document, we empower. And that’s what we need.” ●

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WHY WILD MUSHROOM FORAGER HOBBY HAS ‘EXPLODED’ IN CT

By Jordan Fenster

About twice a week, 6-year-old Eli Galaise goes out hunting for wild mushrooms.

Eli, who lives in Falls Village, is enthusiastic about mushrooms. So much so that he, with some encouragement from his mother, started a YouTube channel where he’s known as “the Little Mycologist.”

“Maybe a year ago or so, we were going on hikes constantly during the pandemic. That’s how we handled it. Every single day, we were outside,” his mom, Carla Galaise, said. “Eli would stop every person we’d walk by

and show them mushrooms and teach them about mushrooms.”

In the videos, Eli is visibly excited about every mushroom he encounters. “I’m never gonna get tired of it,” he said during a recent interview.

He knows most of the Latin and common names of each, and though he’s interested in the edible mushrooms, Eli’s also interested in the odd ones, as well as the poisonous ones.

“I have a bleeding tooth in my yard,” he said. “It’s this really cool one that looks like it’s bleeding this red or sometimes orange watery stuff. It’s cool.”

MORE MUSHROOMS AND MORE FORAGERS

On the whole this has been, according to Bill Yule, one of the better mushroom hunting seasons in recent memory.

Yule has been foraging for mushrooms in Connecticut for the past 30 years or so. The Haddam resident was a science teacher and environmental educator before retiring two years ago. But mushrooms have been and remain his passion.

What made this year so good for mushrooms was the rainfall. Experienced foragers, he said, “spend a lot of time looking at rainfall maps.”

“If you look at Connecticut as a whole, and southern New England as a whole, this was an excellent mushroom season,” Yule said. “You have to follow the exact rain patterns to figure out where the mushrooms are.”

It’s also been a banner year for mushroom hunters. There are more foragers out in the woods now than Yule has ever seen before.

“In the past three years, the popularity of this hobby has exploded in ways no one could have predicted,” he said.

There are two kinds of mushroom hunters. There are foragers, who primarily look for edible mushrooms in the wild, and there are amateur mycologists, who, Yule said, are more interested in cataloging biological diversity and preserving ecology.

For the first group, Connecticut is home to some well known and tasty mushrooms. There is the so-called chicken of the woods, which has a yellow, orange appearance and grows on trees. There are maitake mushrooms, sometimes called hen-of-the-woods, as well as chanterelles and button mushrooms, and many more.

“Just now we’re going into the fall season and people are starting to collect the hen-of-the-woods, the honey mushrooms and the yellow footed chanterelles,” he said. “They are the best edibles.”

Many foragers search for mushrooms for personal use but there is, Yule said, “a whole shadow economy going on.”

Though it’s technically illegal to sell wild mushrooms, Yule said foragers often “sell the mushrooms to brokers from out of state, or on the back steps of restaurants.”

THE ‘DESTROYING ANGEL’ AND THE ‘DEATH CAP’

There are many thousands of types of mushrooms growing wild in Connecticut, Karen Monger, the newsletter editor for the North American Mycological Association and membership coordinator for the Connecticut Valley Mycological Society,

“We have an incredible diversity of mushroom species,” she said. “That is due partly to the fact that we have such a diverse group of trees.”

It can be difficult, sometimes, to tell the difference between edible mushrooms and the ones that can kill you. The so-called “destroying angel,” for example, looks like an innocent button mushroom when it’s young, but eat enough of it and you may need a liver transplant.

In the best of cases, a toxic mushroom might “send you to the bathroom for a couple hours,” Monger said. Other mushrooms might require a trip to the emergency room for intravenous fluids “from your fluid loss from vomiting and diarrhea.”

In the worst cases, “You may need a liver replacement because you’ve eaten the wrong mushroom and the toxins in that particular mushroom have destroyed your liver,” Monger said. “So you know, you don’t gamble with wild mushrooms if you’re going to eat them.”

The destroying angel is common across Connecticut. Julie O’Grady, a Westport forager, said she often sees them in town.

“I see them every day,” O’Grady said. “I mean, every day, every time I go out, we see one somewhere.”

“The sad thing is that it’s an awful death, because what it does is it makes you really sick for a day or two, and then you feel better,” she said. “And then it attacks your liver. You have to have a liver transplant to survive, or it kills you.”

Yule cautions that proper identification is key. There have been about 80 calls so far this year to Connecticut’s Poison Control Center for exposure to potentially poisonous mushrooms.

That’s about on par with last year, when there were 105 calls, and far higher than the 53 mushroom-related calls there were in 2019, perhaps due to the weather conditions and increased number of foragers.

But even edible mushrooms are not always tolerable. Yule is often called to identify which mushroom an ill patient has ingested. Sometimes, it’s a destroying angel or, less often, the toxic death cap mushroom.

But most of the time, it’s because a mushroom has not been prepared well, or because an individual was susceptible in a way another might not be.

“People think that they can lightly saute some mushrooms and eat them, and you can’t,” Yule said. “That’s what the major poison control issues are about.”

IDENTIFICATION

Monger, from Norwich, said it can be difficult to make a precise identification.

“You can’t kind of say, ‘Oh, I wish I could find this mushroom,’ and I find something that kind of looks like it, but this feature doesn’t match up, but I’m gonna overlook that fact,” she said “That could be a very bad mistake.”

Monger said to correctly identify a mushroom, a forager needs to pay attention to any number of factors. “Is it growing on the ground? If it’s growing in the ground is it associated with a bunch of conifer trees or hardwood trees?”

How a mushroom looks, its morphological features, are perhaps the first thing to note, Monger said: “Are you looking at the colors of the mushroom? You see if it has gills, pores, teeth, a smooth underside, does it have a stem? Does it not have a stem? Are you looking at features on the stem? Is there a ring? Are there leftover pieces of a cortina, a waxy substance? You look at the base of the mushroom, is there a bulb, is there a vulval sack?”

But smell is also an important factor. “You can pick up different odors that are an identification clue for the mushroom,” Monger said.

Taking a spore print is a “more ambitious” way to identify a mushroom, Monger said, but it is a helpful way to identify one.

“Taking a spore print is pretty easy,” said Matt Pulk, of Storrs, who is an administrator of several mushroom identification Facebook pages. “Generally, you just put the spore bearing surface, facedown. Usually, depending on the mushroom, some of them will let you know in 10 minutes whereas, other ones, you might leave for 24 hours just to have more of a dense spore collection.”

It’s best, Pulk said, to abstain from eating a mushroom until you’re sure.

“I tell people, unless you can identify for yourself, unless you’ve done your research, unless you’ve consulted with other people who you trust and consider to be as close as an expert in that scenario that can be, then that’s basically the only time you want to eat a mushroom,” he said.

2 PERCENT OF WHAT’S OUT THERE

There are, in fact, so many species of fungi in the world that it’s possible to discover new ones.

“We probably only know about 2 percent of the species on this planet,” said Rachel Koch, a research assistant professor at the University of Connecticut and an expert in mushroom evolution and mushroom diversity.

“So it’s very possible that when people are collecting mushrooms that they might have a new species that hasn’t been described yet, just because morphologically, there’s not a lot of factors that differentiate them.”

Koch said fungi have been on the planet longer than complex plant or animal life.

In fact, she said fungi “make plant life possible, either through associating with them, or returning the nutrients to the soil again, fungi were what allowed plants to come on to the earth really, to evolve.”

“Plants wouldn’t exist if it weren’t for the fungi,” she said.

Interestingly, Koch said fungi are more closely related to human life than they are to the trees on which they often live.

“If you just look at all of the big groups of organisms out there — like plants, bacteria, fungi, animals — animals and fungi are going to be more closely related than if you were to look at fungi and plants,” she said. “There are just more similarities between fungi and animals than there are between fungi and plants.”

SCIENCE VS. FOOD

There are those foragers, like Yule, Pulk and 6-year-old Eli, who are more interested in the science. There are also those foragers, like O’Grady and Monger, who are interested in “mycophagy.”

“Mycophagy is the study of eating mushrooms and cooking mushrooms,” O’Grady said.

O’Grady is the chief mycophagist for the Connecticut-Westchester Mycological Association, one of several mushroom-focused groups in the region. So when the group has a gathering, what they call a “foray,” she makes a mushroom-related meal.

“I cooked dinner for 80 people that’s all mushroom related and we buy a lot of cultivated mushrooms just because we don’t find enough food for 80 people,” she said.

Monger also runs a wild mushroom-related business with her husband and daughter. They’re called The Three Foragers.

“My husband is more concentrated on just pure identification collecting specimens he sends in for DNA analysis,” she said. “He believes he’s found at least two new species this particular year that have not been previously recorded.”

But they all have one thing in common: Though they're excited about mushrooms, they try to keep the best spots to themselves. They may share it with friends and family, but Yule said there are too many foragers and not enough public land on which to forage.

"For the first time this year in my life hunting wild mushrooms, I've seen professional foragers. They work together to forage for edible, saleable mushrooms," he said. "You can recognize them because they don't have a nice, wicker basket, they have four-gallon buckets. ●

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FACEBOOK HEAVILY CRITICIZED AT SENATE HEARING ON MENTAL HEALTH AND INSTAGRAM KIDS ISSUES

By Edward Segal

A fundamental crisis management best practice is not to do or say anything that can make a crisis worse or put your credibility and honesty into question.

Facebook put that best practice to the test—and appeared to miss the mark by a wide margin—at a hearing Thursday by a U.S. Senate Commerce subcommittee about mental health issues related to the social media platform and its postponed launch of Instagram Kids. Antigone Davis, Facebook's head of global safety, represented the company.

As the Washington Post noted, "Senators accused Facebook of dodging questions and burying internal research about how its products may harm children, pledging to further investigate the tech giant during heated confrontations..."

Subcommittee chairman Senator Richard Blumenthal (D-Conn.) said Facebook "... has hidden its own research on addiction and the toxic effects of its products." The company, "has attempted to deceive the public and us in Congress about what it knows, and it has weaponized

childhood vulnerabilities against children themselves. It's chosen growth over children's mental health and well-being, greed over preventing the suffering of children."

Senator Marsha Blackburn of Tennessee, the ranking Republican on the panel weighed in saying that, "You've lost trust, and we do not trust you with influencing our children."

REPEATING TALKING POINTS

Shiri Dori-Hacohen is an assistant professor in computer science and engineering at the University of Connecticut. She noted that, "Davis repeated several talking points again and again, such as the 'positive and uplifting content,' ...Davis likewise rejected multiple senator's characterizations of Facebook's products as 'addictive' or the comparison to cigarettes."

FORBES LEADERSHIP

The Wall Street Journal reported that Davis, "... largely succeeded in sticking to the company line that the company's internal research had been misinterpreted, while deflecting many of the senators' tougher questions. But her tactics might have cost Facebook goodwill in Congress at what could be a crucial time."

AVOIDING THE HARDER ISSUE

"But at the end of the day, she avoided dealing with the harder issue at hand which is that many Americans are rightly concerned about the negative impact of their products on teens, adults, and our society as a whole," Dori-Hacohen said.

She observed that, "Facebook can't talk their way out [of] this mess, and regulators may well get fed up with the current state of affairs. Several bills limiting Facebook's (and other social networks) activities were mentioned during this hearing; at some point in the not too distant future, we may see these proposed regulations enacted into law."

TRANSPARENCY QUESTIONED

Dori-Hacohen said that, "Ms. Davis on behalf of Facebook claimed time and time again that it upholds transparency, to which Subcommittee Chair Blumenthal rightly pointed out that the majority of documents

under discussion were released by a whistleblower.” The whistleblower is scheduled to be interviewed on CBS’ 60 Minutes on Sunday.

SENATE COMMERCE SUBCOMMITTEE HEARING ON PROTECTING KIDS ONLINE

“Furthermore, Ms. Davis made a statement regarding Facebook’s attempts at making information available to researchers. The reality is quite different: Facebook significantly lags [behind] other social media companies such as Twitter and Reddit in allowing researchers to access their platform, and has even banned a researcher from their platform for engaging in disinformation research,” she noted.

NOTHING NEW FOR FACEBOOK

Ari Lightman is a professor of digital media and marketing at Carnegie Mellon University’s Heinz College. He said the news today from the Capitol about Facebook “does not look good. However Facebook has been under this sort of scrutiny and pressure before and has weathered through it. It’s not the fact that Instagram causes harm to teens, it’s more of the fact that the company tried to downplay the research or even bury it.

“We have known that too much online activity can have negative impact on children’s well-being whether that’s consuming content, engaging in video games or flipping through digital news feeds. I think we are in a phase of heightened sensitivity to issues of mental health due to the societal implications of a global pandemic, issues focused on privacy/security, heightened concern over AI based targeting algorithms, etc.”

ISSUES WILL PERSIST

Lightman said, “With Instagram having such a massive reach, it becomes very difficult to moderate the feed to any specific user to make sure it does not constitute harm which can be very subjective...there will be increased scrutiny on the current platform especially as it relates to kids.

“Instagram has been taking steps associated with age verification asking for birthdate as well as proof of age from an acceptable ID but there are still issues that persist around fake accounts, underage users, and

especially misalignment (harmful) associated with targeting on Instagram,” he concluded. ●

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ON OCTOBER 5, 2021

HALLOWED CHANGING OF THE GUARD GETS AN ALL-FEMALE CAST AT ARLINGTON

For 84 years, Army soldiers have performed the changing of the guard at the tomb at Arlington National Cemetery. Last month, for the first time, it was carried out by three women.

By Maria Cramer

It was the final changing of the guard for Sgt. First Class Chelsea Porterfield.

She was completing 20 months of service as the first female Sergeant of the Guard, running the day-to-day operations of the unit that for 84 years has stood watch over the Tomb of the Unknowns at Arlington National Cemetery.

Early on Sept. 29, before the cemetery opened to the public, Sergeant Porterfield walked in slow, perfectly synchronized step with two white-gloved women clutching M14 rifles fitted with bayonets.

The changing of the guard, a hallowed military tradition, has transfixed visitors to the Washington, D.C., area for decades. But this was the first time it had been carried out by three women, whose schedules happened to align that morning, according to a military spokesman.

The image of three women upholding a sacred ritual underscored how visible women have become in the military, and moved fellow soldiers, veterans and military historians.

“I never thought I would see it happen in my lifetime,” said First Lt. Ruth Robinson, a friend of Sergeant Porterfield, who attended the ceremony.

Lieutenant Robinson, 33, was a Tomb Guard from 2015 and 2017, and was the only woman in the unit at the time.

“To see not only one female, but to see three just feels really astounding,” she said.

The tomb was created in 1921 as the final resting place for the unidentified remains of a soldier who was killed in World War I. At the time, it was imagined “as a site that would create the sense of the entire country as one group mourning and honoring sacrifice,” said Micki McElya, a professor of history at the University of Connecticut and the author of “The Politics of Mourning: Death and Honor in Arlington National Cemetery.”

In 1937, the military installed a 24-hour post at the tomb. Since then, soldiers have guarded the tomb in shifts that last 30 minutes to an hour, depending on the time of year.

Women were not allowed to volunteer for the Tomb Guard Platoon until 1994, according to the Society of the Honor Guard, an organization that works to preserve the history of the site. From 1996 to 1998, three women earned the Tomb Guard Identification Badge.

None earned the badge again until 2015, when Lieutenant Robinson began her post as part of the 3rd U.S. Infantry Regiment, the Army’s oldest active-duty infantry unit, which is known as the Old Guard and includes the Tomb Guard.

The Tomb Guard’s duties are highly respected, but grueling.

The soldiers must be in “superb physical condition” and have an unblemished military record, according to Arlington National Cemetery. Before they can qualify, soldiers must memorize a 17-page document detailing the cemetery’s history and recite it verbatim to their training officer, Lieutenant Robinson said.

During the changing of the guard, a sergeant or corporal walks to the plaza with another guard to relieve the soldier in an elaborate ceremony that takes place in blizzards, rainstorms and heat waves.

Guards can be relieved only if remaining at the tomb would put their lives at risk, said Major Shahin Uddin, a spokesman for the infantry.

During the ceremony last week, Sergeant Porterfield laid roses at the tomb, where the remains of servicemen from World War II and the Korean War are buried in crypts next to the white marble sarcophagus that contains the remains of the unidentified World War I soldier. The tomb also includes an empty crypt that once held the remains of an Air Force pilot who was killed in the Vietnam War but was identified in 1998 through DNA.

In the cemetery itself, there are 4,723 unknown soldiers who died in wars dating to the Civil War, Lieutenant Robinson said.

Sergeant Porterfield declined to comment. Major Uddin said the Army could not release the names of the soldiers who walked with her because of the solemnity of their duty.

“They really do their best to deflect attention and remain unknown because what they’re doing is sacred,” he said.

Lieutenant Robinson said that was a general sentiment among the soldiers who served at the tomb.

“It’s been four years now since my last walk, and I’m now just getting more comfortable talking about it,” she said. “You never want it to be about you. You want it to be about the unknowns.”

The images of the three female soldiers were a “visual marker” of the often unrecognized sacrifices that women and other marginalized people in the United States have made for the military, Professor McElya said.

“Women have served either officially or unofficially in every single war this country has ever waged, but they have never been drafted,” she said. “So if we want to talk about sacrifice and honor, women have done that because they wanted to.”

The changing of the guard was also an important moment in military history, one that showed that women are serving in “the most revered positions,” said Kara Dixon Vuic, a professor of war, conflict and society in 20th-century America at Texas Christian University in Fort Worth.

“These are the rituals that the nation holds dear,” she said. “Some might call it militaristic and some might say it represents the best of us. But to have women at the

heart of it, whatever your perspective is, is important because it shows that women are at the heart of these debates now.”

Sergeant Porterfield, who plans to retire from the Army next year after 20 years of service, will not be succeeded by another woman. Two women — the soldiers who walked with Sergeant Porterfield — remain in the Tomb Guard Platoon, Major Uddin said.

So as momentous as her final changing of the guard was, it was also unique, Professor McElya said.

“It’s not going to happen again anytime soon,” she said. ●

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THE POWERFUL MESSAGE BEHIND 'MAID'

By Amy K. Matsui

The new Netflix series "Maid" -- largely based on the bestselling memoir of the same name by Stephanie Land -- tells a story familiar to many mothers fighting to keep their heads above water. Fleeing a violent partner while trying to do right by her child, Alex (portrayed by Margaret Qualley) finds navigating the requirements of emergency shelters and public programs a Kafkaesque maze that adds to the trauma of her own poverty. "I need a job to prove that I need day care in order to get a job?" laments Alex while filing for child care subsidies. "What kind of f**kery is that?"

Single mothers like the character of Alex have often been demonized for relying on public benefits like child care subsidies and nutritional assistance, especially if they are Black or brown. And many policymakers seem to go to great lengths to make relying on public programs the most difficult and humiliating of propositions. Whether it's providing benefit levels so low that people are virtually guaranteed to run out of food by the end of the month, or requiring in-person visits to benefits offices that aren't accessible by public transportation, or mandating online reporting on websites that don't work on mobile phones -- the goal is

clearly to discourage the use of public benefits, rather than to provide a fallback plan when families hit hard times.

Even in the midst of historic levels of unemployment precipitated by a pandemic, a shocking number of states turned down the federal boost to unemployment benefits. Centrist Democrats have floated some "means-testing" proposals that would narrow the cohort of people eligible for free community college or child care as Congress debates the contours of the Build Back Better legislation. And West Virginia Sen. Joe Manchin explicitly suggested adding work requirements to the expanded Child Tax Credit (CTC). But as both "Maid" and the lived experience of any family in poverty can tell you, such rules when applied to child care and CTC only serve to further burden working mothers while denying support to the very children the programs are supposed to benefit.

The racist specter of the "welfare queen" exploiting public benefits to avoid work is so persistent in our politics it blocks out actual facts, research and data. According to estimates from the Treasury Department, more than 97% of the beneficiaries of the Child Tax Credit, which was expanded under the American Rescue Plan and would be extended to 2025 under the House Ways and Means Committee's draft of the Biden administration's Build Back Better legislation, are working families with wages or self-employment income. Particularly after a pandemic that devastated the economic security of domestic workers -- such as Qualley's Alex in "Maid" -- it should be a no-brainer to extend the fully refundable, expanded CTC as part of the Build Back Better bill.

A recent study by Wei Zheng at the University of Connecticut found that increases in the average CTC led to increases in labor force participation for single mothers, and another study from Humanity Forward found that nearly 94% of parents were doing the same amount, or more, paid work, due to the monthly CTC payments. The Niskanen Center concluded that the CTC promotes work by helping parents compensate family and relatives for child care. For workers -- like the fictional Alex -- perpetually on the edge of financial disaster, \$300 per month can make the difference between paying for a car repair and losing the job they otherwise can't drive to.

'Maid' Netflix series based on Stephanie Land's life shows reality of poverty and abuse

In "Maid," Alex's job as a domestic worker is just enough to keep her from falling completely into the red, but, as the nearly 800,000 US domestic workers accounted for by the Bureau of Labor Statistics in 2020 know, an average wage of \$13.48 leaves little slack for emergencies or planning for the future. Viewers get a close look at this constant state of precarity via a live tracker of Alex's funds that periodically appears on the screen, getting ever closer to zero with every meal bought for her daughter Maddy or tank of gas pumped into her aging car.

A benefit like the CTC is hardly enough to put real moms into the lap of luxury -- such as the lifestyle of Alex's housecleaning clients -- but the breathing room it does provide their budget has a monumental impact for them and their children. According to the Urban Institute, making the expanded CTC permanent could reduce child poverty by more than 40%, giving millions of children across the country a stronger start in life.

The CTC fits a pattern that stretches across America's social safety net. Whether it's tax benefits like the CTC or food assistance or housing vouchers, public investments have been shown time and again to help lift children (like the fictional Maddy) out of poverty -- improving their educational outcomes, their physical health and their overall well-being -- by helping parents (like the fictional Alex) keep their heads above water. Congress regularly hands out subsidies to dangerous industries poisoning our planet with few questions asked, but then subjects working mothers to a litany of intimate scrutiny. To borrow a phrase from Alex -- what kind of f**kery is that?

The mythology of poverty often looms larger in our politics than the reality of poverty. The truth for millions of single mothers is laid bare in "Maid," which is that work is no guarantee against poverty. And Stephanie Land, on whose life the series is largely based, openly acknowledges the circumstances she faced -- domestic violence, homelessness, poverty and domestic work -- are more commonly experienced by Black, brown, and immigrant mothers than White women like herself.

Humiliating and stigmatizing women who are striving not only to work but also to comply with burdensome requirements for public benefits, only perpetuates

racial dynamics based on stereotypes about marginalized mothers that continue to shape our politics. With a historic opportunity to reshape public benefits before Congress, we should do everything we can to invest in the potential of parents like Alex and their children instead of further adding to their hardship. ●

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BIDEN WANTS MORE WIND ENERGY. THOSE PROJECTS SHOULD HELP LOCAL POLITICIANS, OUR RESEARCH FINDS.

Wind turbines don't just deliver clean energy; they help both Republican and Democratic incumbents win reelection.

By Oksan Bayulgen, Carol Atkinson-Palombo, Mary Buchanan, and Lyle Scruggs Turchin

Despite Sen. Joe Manchin III's (D-W.Va.) opposition to investing in clean energy in the Democrats' signature social investment bill, the Biden administration has been steadily working to advance renewable energy. In January, he signed executive orders to combat climate change, including a national goal to generate 30 gigawatts of electricity from offshore wind turbines by 2030. In March, the administration announced a massive, coordinated effort to bolster several offshore wind energy projects along both the Northeast and Pacific Northwest coasts. And last week, Interior Secretary Deb Haaland announced that the agency will begin identifying federal waters appropriate to lease to wind developers, with the goal of doing so by 2025.

Can all of this succeed? That depends partly on state and local officials who control many aspects of the siting, terms and pace of these projects. Whether they are willing to cooperate depends on how much their residents welcome wind turbines. While Americans support wind energy generally, the NIMBY problem

applies: Sometimes people support massive wind energy projects in the abstract, but don't want them close by.

Even when some locals object, however, our research finds that wind development projects onshore helps incumbents — of either party — win more votes for reelection. Here's how we know.

LESSONS FROM ONSHORE WIND

While the United States hasn't developed many offshore wind farms yet, onshore wind power has grown rapidly over the past 15 years. That has been encouraged by a rapid decline in the cost of equipment, as well as various federal and state government guarantees and incentives. For instance, the federal government provides a production tax credit (PTC), which subsidizes the cost of producing wind and other renewable energy. Most states also set renewable portfolio standards (RPS), which promote renewable electricity production by requiring that electric utilities source some power from renewable sources.

By 2019, the United States produced more energy from wind than from hydropower. In 2020, the United States recorded the largest annual expansion in wind capacity. While offshore and onshore wind development differ somewhat, including in where the opposition comes from and how intense it can be, we can learn something about the political implications of both by looking at how onshore wind farms have affected politicians' fortunes.

PROMOTING WIND DEVELOPMENT IS A WINNING STRATEGY

Our research focused on Minnesota, one of the 10 U.S. states with the highest installed wind capacity. We merged the U.S. Wind Turbine Database, which lists the locations of all utility-scale U.S. wind turbines, with voting and census data at the precinct level, to examine how adding a wind turbine between elections affected incumbent state legislators' share of the vote in the next election, between 2006 and 2018.

According to our analysis, adding at least one turbine in a precinct increases the share of the incumbent party's vote in the next election by anywhere from 1.8 to 9 percentage points. (The exact number depends on the statistical assumptions we use to estimate the effect.)

BOTH DEMOCRATIC AND REPUBLICAN INCUMBENTS WIN

We also examined whether the electoral effects of turbine development differ for Republican and Democratic state legislators. We find that the expected gains are about the same for both major political parties (in one model, 5.5 points for Democrats vs. 7.1 points for Republicans; in another model, 7.0 vs. 6.5 points, respectively).

Our findings are consistent with polling that finds bipartisan national public support for wind energy projects, with recent reports from the nonpartisan Pew Research Center finding up to 77 percent of Americans in favor. While Democrats may support wind energy's positive effects on the climate, most citizens support its economic opportunities, including jobs and tax revenue.

WHAT THIS MEANS FOR BIDEN'S CLEAN ENERGY AGENDA

The Biden-Harris administration's push for a transition to renewable energy can only succeed if clean energy infrastructure is socially accepted and politically rewarding for the elected representatives who must implement it. If voters punish politicians who develop wind in their jurisdictions, those politicians — and others — are likely to abandon their support. But the opposite is just as true: If politicians win more votes because they have built wind energy projects, we are likely to see more such developments.

Our findings suggest that, at least in Minnesota, developing wind farms helps politicians win reelection. We think our results might be true for other states as well. During the past decade of rapidly expanding wind farms, most have been built not in blue, coastal states, but in very red parts of the middle of the United States, where it is easiest to reap energy from wind. According to the Energy Information Agency, the top four states for wind energy production are Texas, Iowa, Oklahoma and Kansas. Red states are adding capacity as fast or faster than blue states.

To be sure, our project did not control for well-funded local opposition, like the campaign that blocked the Cape Wind development off Massachusetts. However, our findings should allay politicians' fears of backlash if renewable energy projects are sited in their districts. We can't promise that wind turbines always win votes

for incumbents, but our results suggest that on average, such developments help both Republicans and Democrats. ●

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ON OCTOBER 21, 2021

THE HORSE BIT AND BRIDLE KICKED OFF ANCIENT EMPIRES – A NEW GIANT DATASET TRACKS THE SOCIETAL FACTORS THAT DROVE MILITARY TECHNOLOGY

By Peter Turchin

Starting around 3,000 years ago, a wave of innovation began to sweep through human societies around the globe. For the next millennium the continued emergence of new technologies had a dramatic effect on the course of human history.

This era saw the advancement of the ability to control horses with bit and bridle, the spread of iron-working techniques through Eurasia that led to hardier and cheaper weapons and armor and new ways of killing from a distance, such as with crossbows and catapults. On the whole, warfare became much more deadly.

During this era, many societies were consumed by the crucible of war. A few, though – the Achaemenid Persian Empire, the Roman Empire and Han China – not only survived, but thrived, becoming megaempires encompassing tens of millions of people and controlling territories of millions of square miles.

So what drove this cascade of technological innovation that literally changed the course of history?

We are a complexity scientist, Peter Turchin, and a historian, Dan Hoyer, who have been working since 2011 with a multidisciplinary team to build and analyze a large database of past societies. In a new paper published in PLOS One on Oct. 20, 2021, we describe

the main societal drivers of ancient military innovation and how these new technologies changed empires.

A DATABASE FOR HUMAN HISTORY

The store of knowledge about the past is truly enormous. The trick is to translate that knowledge into data that can be analyzed. This is where Seshat comes in.

The Seshat Databank is named after Seshat, an ancient Egyptian goddess of wisdom, knowledge and writing. Founded in 2011 as a collaboration among the Evolution Institute, the Complexity Science Hub Vienna, the University of Oxford and many others, Seshat aimed to first systematically gather as much knowledge about humanity's shared past as possible. Then our team formatted that information in a way that allows researchers to use big-data analytics to look for recurrent patterns in history and test the many theories aiming to explain such patterns.

The first step in this process was to develop a conceptual scheme for coding historical information ranging from military technology to the size and shape of states to the nature of ritual and religion. The database includes over 400 societies across all world regions and ranges in time from roughly 10,000 B.C. to A.D. 1800.

In order to trace the evolution of military technologies, we first broke them down into six key dimensions: hand-held weapons, projectiles, armor, fortifications, transport animals and metallurgical advances.

Each of these dimensions was then further divided into more specific categories. Altogether we identified 46 such variables among the six technological dimensions.

For example, we distinguish types of projectile weapons into slings, simple bows, compound bows, crossbows and so on.

We then coded whether or not each historical society in the Seshat sample wielded these technologies. For example, the earliest appearance of crossbows in our database is around 400 B.C. in China.

Of course, humanity's knowledge of the past is imprecise. Historians may not know the exact year crossbows first appeared in a particular region. But imprecision in a few cases is not a serious problem given the staggering amount of information in the

database and when the goal is to discover macrolevel patterns across thousands of years of history.

COMPETITION AND EXCHANGE DRIVE INNOVATION

In our new paper, we wanted to find out what drove the invention and adoption of increasingly advanced military technologies around the globe during the era of ancient megaempires.

Utilizing the massive amount of historical information collected by the Seshat team, we ran a suite of statistical analyses to trace how, where and when these technologies evolved and what factors seemed to have had the largest influence in these processes.

We found that the major drivers of technological innovation did not have to do with attributes of states themselves, like population size or the sophistication of a governance.

Rather, the biggest drivers of innovation appear to be the overall world population at any given time, increasing connectivity among large states – along with the competition that such connections brought – and a few fundamental technological advances that set off a cascade of subsequent innovations.

Let's illustrate these dynamics with a specific example. Around 1000 B.C., nomadic herders in the steppes north of the Black Sea invented the bit and bridle to better control horses when riding them.

They combined this technology with a powerful recurved bow and iron arrowheads to deadly effect. Horse archers became the weapon of mass destruction of the ancient world. Shortly after 1000 B.C., thousands of metal bits suddenly appeared and spread within the Eurasian steppes.

Competition and connection then grew between the nomadic people and the larger settled states. Because it was hard for farming societies to resist these mounted warriors, they were forced to develop new armor and weapons like the crossbow.

These states also had to build large infantry armies and mobilize more of their populations toward such collective efforts as maintaining defenses and producing and distributing enough goods to keep everyone fed.

This spurred the development of increasingly complex administrative systems to manage all these moving parts. Ideological innovations – such as the major world religions of today – were also developed as they helped to unite larger and more disparate populations toward common purpose.

Within this cascade of innovation we see the origins of the world's first megaempires as well as the rise and spread of world religions practiced by billions of people today. In a way, these critical developments can all be traced back to the development of the bit and bridle, which allowed riders better control of horses.

Each step in this line has been long understood, but by employing the full range of cross-cultural information stored in the Seshat databank, our team was able to trace the dynamic sequence tying all these different developments together.

Of course, this account gives a greatly simplified explanation of very complex historical dynamics. But our research exposes the key role played by the intersocietal competition and exchange in the evolution both of technology and of complex societies.

Although the focus of this research was on the ancient and medieval periods, the gunpowder-triggered military revolution had analogous effects in the modern era.

Perhaps most importantly, our research shows that history is not “just one damn thing after another” – there are indeed discernible causal patterns and empirical regularities through the course of history. And with Seshat, researchers can use the knowledge amassed by historians to separate theories that are supported by data from those that are not. ●

OVERLOOKED NO MORE: KIM HAK-SOON, WHO BROKE THE SILENCE FOR 'COMFORT WOMEN'

Her public testimony about the horrors of sexual slavery that Japan had engineered for its World War II military encouraged other survivors to step forward.

By Choe Sang-Hun

On Aug. 14, 1991, a woman who lived alone in a flophouse here faced television cameras and told the world her name: Kim Hak-soon. She then described in gruesome detail how, when she was barely 17, she was taken to a so-called comfort station in China during World War II and raped by several Japanese soldiers every day.

"It was horrifying when those monstrous soldiers forced themselves upon me," she said during a news conference, wiping tears off her face. "When I tried to run away, they caught me and dragged me in again."

Her powerful account, the first such public testimony by a former "comfort woman," gave a human face to a history that many political leaders in Japan had denied for decades, and that many still do: From the 1930s until the end of the war, Japan coerced or lured an estimated 200,000 women into military-run rape centers in Asia and the Pacific, according to historians. It was one of history's largest examples of state-sponsored sexual slavery.

MORE IN 'OVERLOOKED'

Kim died of a lung disease when she was 73, on Dec. 16, 1997, just six years after the testimony. But she left a long-lasting legacy and inspired other former sex slaves to come forward in Japan, the Philippines, Indonesia, Malaysia, China, Australia and the Netherlands.

"Nothing that I wrote could come close to the impact of the personal firsthand account given publicly by Kim Hak-soon 30 years ago," Gay J. McDougall, a former

United Nations special rapporteur whose 1998 report defined Japan's wartime enslavement of comfort women as crimes against humanity, said this year at a conference about Kim's legacy.

In South Korea, 238 former comfort women would eventually step forward. A protest started by Kim and others—in 1992—is held outside the Japanese Embassy in Seoul every Wednesday. Amid the uproar triggered by her testimony, Tokyo issued a landmark apology in 1993, admitting that the Japanese military was, "directly or indirectly, involved in the establishment and management of the comfort stations," and that "coaxing" and "coercion" were used in the recruitment of comfort women.

"She remains one of the bravest people of the 20th century," said Alexis Dudden, a history professor at the University of Connecticut who specializes in Korea-Japan relations. "Kim Hak-soon's initial statement propelled researchers to unearth documentary evidence to support her claims, which began the still-ongoing process of holding the Japanese government accountable for what the United Nations defines as a war crime and crime against humanity." Kim Hak-soon was born on Oct. 20, 1924, in Jilin, in northeastern China, where her parents had migrated during Japan's colonial rule of Korea. Her father died shortly after her birth. She and her mother returned to Korea, where her mother remarried.

When Kim was 15, she was adopted by another family, which enrolled her in a school for kisaeng, female entertainers who learned to sing, dance, play musical instruments and write poems to entertain upper-class men. After her graduation in 1941, her adoptive father took her and another adopted daughter to China to find them jobs. But shortly after they arrived in Beijing, Japanese soldiers detained them.

The two girls were taken by truck to a military unit with a red brick house attached to it. Kim was raped by a Japanese officer on the first night in that house, she said in "The Korean Comfort Women Who Were Coercively Dragged Away for the Military, Vol. 1" (1993), a book of testimonies by former comfort women.

There were five Korean girls there, at least three of whom were teenagers. The soldiers guarded the house, supplied food and used the girls for sex, even when they had their periods. Once a week, a military doctor came

to check them for venereal diseases. When Kim tried to run away or resist the soldiers, she was kicked and flogged.

“On days when the soldiers returned from expeditions, we each had to take as many as 10 to 15 men,” Kim said on South Korea’s KBS-TV in 1992. “They took us as if we were some kind of object, and used us however they wanted. When we broke down with problems like diseases, they abandoned us like objects or killed us.” ●

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DEATH HOLIDAYS AND WHY WE CELEBRATE THEM

By Jenny Morber

Oct. 29, 2021 -- Autumn is a season of preparation: It is a time of harvest before scarcity, gathering seeds before snow, crispness before cold, and vibrant color before grey monotony. With that, it’s not surprising that many cultures mark the season by celebrating abundant life in parallel with inevitable death and remembering those who came before. But these holidays in different regions around the world are a study in contrasts.

Among the most commercialized of these celebrations is the U.S. custom of Halloween. It has a carnival atmosphere in which, “revelry, chaos, and possibly scary things can just run amok,” says Sojin Kim, PhD, curator at the Smithsonian Center for Folklife and Cultural Heritage. The day (or night) is about losing inhibitions and poking fun at the horrifying. Halloween nods at mortality with imagery of skeletons and murderous dolls, but the focus is on decorations, costumes, and candy. Absent is a sober pause to remember the finality of life.

“American Halloween is just such a perfect representation of what American culture does to death,” says Erica Buist, author of *This Party’s Dead*, a book about death festivals around the world.

“Halloween -- Samhain -- was a [Celtic] death festival, and the Americans have taken it and they’ve made it

spooky,” she says. “It’s a way of engaging with it, without any of the actual engagement.”

Religious holidays like Catholic All Souls’ Day make space for a more eyes-forward recognition of mortality through visiting the gravesites of lost loved ones. But in secular U.S. society, such opportunities are few. Perhaps that is because in U.S. culture, “Death is scary. Death is gross,” Kim says.

Halloween is perhaps a way to push back -- to make death flamboyant or even darkly funny.

“Death is not only a terrifying prospect, but also a very abstract one, because we cannot imagine what it is like to not exist,” says Dimitris Xygalatas, PhD, an anthropologist and cognitive scientist at the University of Connecticut.

But in non-U.S. cultures, “people have a different relationship to death, where it is much more acknowledged as something that we deal with every day,” Kim says.

Occurring just after Halloween in many Latin countries, the Day of the Dead descended from South American indigenous celebrations. According to legend, on this day, ancestors come back to life to feast, drink, and dance with their living relatives. In turn, the living treat the dead as honored guests, leaving favorite foods and gifts such as sugar skulls on shrines or gravesites.

It is a day of celebration, “not being fearful of death, but really seeing that death is a part of life,” Kim says.

The Sicilian Day of the Dead is similarly festive. Families bring flowers to brighten gravesites, and parents hide “gifts from the dead” for their children to find in the morning, strengthening the bond between generations. Shops are brightened by marzipan fruits and cookies that resemble bones. These practices teach children that, “you can mention these people, you are supposed to talk about them,” Buist says.

Then there’s the Japanese Buddhist celebration of Obon, which typically takes place in August and also focuses on ancestors. For Obon, people will clean gravesites and perhaps share a meal, but the biggest public expression happens at the temples. People hang or float lanterns with names of those who have died that year, and the community comes together to dance. Music accompanied by the booms of live drums is customary and whether the songs are traditional or

contemporary, "the idea really is that you are dancing without ego. You are dancing without caring about what you look like. And you are dancing to remember the ancestors who gave you your life and this moment," Kim says.

Similar celebrations are held in China, Nepal, Thailand, Madagascar, Spain, Ireland, India, Haiti, and the Philippines. Death holidays seem as human as language. Their importance centers on "this idea of continuum versus end," Kim says.

Emphasizing this cyclical view, death holidays encourage a continued relationship with the dead, Buist says. "Have you ever heard that phrase, 'Grief is love with nowhere to go?'" she asks. "It's this thing that we say here, and I feel like everywhere else they've gone, 'well give it somewhere to go then.'" Across cultures, many of the traditions of these holidays are "just like taking care of somebody," she notes.

Death holidays give love somewhere to go, and they give us a time and place to do it.

"Having these things punctuate the calendar means that we get this designated time and space," says Kim, noting that they enable our coping with death in a community space. These practices ensure that we do not have to grieve, consider our legacies, commemorate lost family and face our mortality alone.

The ritual of death holidays, Xygalatas says, "makes the prospect of our own death just a little less terrifying." ●

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STATE REPUBLICANS SEE OPPORTUNITY FOR BIG WINS IN 2022

By Ken Dixon

Connecticut Republicans were feeling good about themselves on Wednesday and said that their ability to flip nearly 20 towns from blue to red indicates they are in good position for the statewide races including governor and congressional seats next year.

They pointed to GOP gains including the Virginia governor's race and a tightly contested election in New Jersey, where the Associated Press says Democratic Gov. Phil Murphy narrowly won a second term.

Whether the results of Connecticut's 30 percent turnout Tuesday can be translated into predicting the statewide elections of next year, when 60 percent or more of the electorate will likely cast ballots, is an unanswerable question a year from Gov. Ned Lamont's expected run for reelection.

Still, the results from Tuesday night have the GOP moving in the right direction. Republicans held on to the mayoral seats in New Britain, Torrington and Danbury — cities with a Democratic edge — and won the open first selectman jobs in Westport and Darien. They also flipped the mayor's post in Bristol, and wrested the first selectman's seat from Democrats in Brookfield, Windsor Locks, East Granby, Portland and 15 other small towns, many in eastern Connecticut.

"New Jersey is definitely a warning to Ned Lamont," Ronald Schurin, a professor of political science at the University of Connecticut, said Wednesday in an interview.

With President Joe Biden's sweeping, \$3 trillion infrastructure and social spending proposals stalled in Washington, Schurin said, "Democrats are in kind of a funk. ...Maybe Democratic turnout and enthusiasm was down."

But he warned against reading too much into the results.

"This is not a wave election. This was an election when Republicans did a little better and some Democrats won some seats. Local elections are usually about local issues, but things nationally, like education have risen in importance."

Republican State Chairman Ben Proto painted a starker picture of the Democrats. "They took a shellacking," he said. "They failed in every race they targeted."

Proto said voters seemed motivated against what he calls Democratic overreach, as the party's effort to link Republicans to Donald Trump appeared to backfire.

"The reality is that a lot of what happened not only in Connecticut, but across the country, is that races were nationalized. I think you can only cry wolf so long and

the Democrats have been crying Trump for five years. We know what's happened with Joe Biden over 10 months with the rise of prices. I think at the end of the day, in 2022 the Democrats are in trouble."

With Gov. Ned Lamont's approval numbers at slightly over 50 percent, he's vulnerable next year, Proto added.

Lamont, who is widely expected to seek a second four-year term, discounted the returns as strictly local races with local issues such as the coalition of Democrats and unaffiliated candidates who swept the Guilford school board race over five conservative Republicans.

"Stamford stayed Democratic, Danbury stayed Republican," Lamont said. "Some of the other towns went back and forth. I was watching a lot of the World Series yesterday, but I noticed what was going on in Virginia. I noticed what was going on in New Jersey. In New Jersey, I think taxes were a big issue there. It's a little different here in Connecticut. I'm the first governor in 30 years that didn't raise taxes."

Lamont said the Connecticut political map was town-by-town Tuesday. "I just think we had an election and I think probably Virginia and New Jersey are getting a wake-up call," Lamont said.

Asked if he would announce his future intentions, Lamont declined. "I'm going to put that off a little more," he said.

He said Connecticut remains in good shape. "I think we're fine," he said on a New Haven street corner outside a home where Afghan refugees have been relocated. "I think Connecticut feels like they're in a pretty good place right now. We're doing well in terms of jobs, doing well financially and most importantly doing well in terms of COVID."

Themis Klarides, the former minority leader of the state House of Representatives who has filed preliminary documents for a run for governor next year, said in a Wednesday interview that the Tuesday votes illustrated the vulnerability of Democrats who have control of the General Assembly, the congressional delegation and the top constitutional officers including governor and attorney general.

"Last night shows that the majority of Republicans who run towns and cities got reelected, and we got people elected in many towns because we run better, more cost-effective services for residents," Klarides said in a

phone interview. "Virginia and New Jersey are certainly very significant and the results bode well for 2022. The Republican agenda is very focused on public safety, lowering crime, allowing people to stay safe in their homes, supporting education and being fiscally responsible."

Bob Stefanowski, of Madison, the 2018 Republican candidate who lost to Lamont and is expected to soon announce his candidacy for 2022, tweeted Tuesday night: "Great to see what we've heard across CT validated at the polls. Residents want to feel safe. They want a say in their kid's education. They want lower taxes. And they realize @CTDems have failed on all 3 & @CTGOP can bring it back home!"

Later Wednesday, the Democratic State Central Committee released a list of victories including flips of the executive seats or legislative panels in Avon, Coventry, Enfield, Roxbury, Tolland and Fairfield. And state Rep. Caroline Simmons of Stamford became the first woman to win a mayoral election in Stamford.

In Norwalk, Democrats won a super majority on the City Council, defeating Republicans who ran against police transparency legislation that became state law last year.

Gary Rose, professor and chairman of the Department of Government at Sacred Heart University, said Wednesday that the Guilford school board race, which resulted in 50 percent turnout and a crushing, 2-to-1 defeat of the five GOP candidates, was an outlier in a mostly good night for Republicans.

"Overall it is true that Republicans did pretty well, in council races, first selectmen and mayor, while in some places they lost, they did remarkably well," Rose said.

"If one wants to analyze why Republicans did well, I would say that the national scene, the tenor of politics at our national level, is starting to actually work its way into statewide races like Virginia and even local council races," Rose said. "Do I think Connecticut is realigning? I am not saying that at all. I think we're seeing what's happening inside the [Washington D.C.] beltway has reached out its tentacles." ●

SKEPTICAL OF FINANCIAL PLEDGES, DEVELOPING NATIONS CONTINUE TO SEEK 'CLIMATE JUSTICE'

By Ben Adler

GLASGOW, Scotland — More than 450 companies with a combined \$130 trillion in assets have joined the Glasgow Financial Alliance for Net Zero, a coalition of financial firms that have pledged to reach net-zero greenhouse gas emissions by midcentury, it was announced on Wednesday.

Despite that commitment, advocates for “climate justice” at the U.N. Climate Change Conference say there are a number of unresolved issues that the private sector commitments do not address.

“Yesterday we had Finance Day. Unfortunately, we didn't get the assurance, the signals, that developing countries were looking for from the developed countries,” said Mohamed Adow, the director of Power Shift Africa, a climate and energy think tank, at a press conference Thursday morning. “Finance Day” refers to Wednesday’s official theme at the conference, also known as COP26.

Overall, Adow said, the announcements amounted to “dismal progress.”

There are five main reasons that activists and experts say the financial commitments from wealthy nations and their industries are still insufficient to ensure a fair agreement that prevents catastrophic climate change:

LACK OF GOVERNMENT FUNDING FOR DEALING WITH CLIMATE CHANGE IN POORER COUNTRIES

Back in 2009, in order to get developing nations to sign on to the Copenhagen Accord, developed nations pledged to provide \$100 billion to combat and adapt to climate change by 2020. But 12 years later, that \$100 billion hasn't been reached. Mobilizing private sector investment is considered a valid way of meeting that

goal, under the terms of the agreement, but the pledges made Wednesday are set out over a long time horizon. Essentially, developing countries are saying, “Show us the money, now!”

At Thursday’s press conference, which was organized by the Climate Action Network, Adow called on developed countries to “provide assurance to the vulnerable countries that the \$100 billion they were promised 12 years ago is going to be delivered.” Otherwise, all pledges of future action are going to be taken with a big grain of salt.

THE PRIVATE SECTOR DOESN'T PAY AS MUCH FOR ADAPTATION

Banks lend money for projects that they think will make them a profit. So to live up to a pledge of reaching net-zero emissions by 2050, banks will probably have to transition from lending money to fossil fuel companies to produce oil, gas and coal to lending money to companies that build solar panels, wind turbines and other forms of clean energy.

But what about the effects of climate change that have already happened, or will soon occur? Poorer countries — which also tend to be in regions like South Asia, Africa, the Middle East and Latin America — are already dealing with problems like extreme heat waves, more intense storms and sea level rise that they are ill equipped to handle. The agreement for \$100 billion per year is supposed to set aside half of that funding for adapting to climate change, but funds for adaptation have been especially lagging, because giving a country like Bangladesh money to build a sea wall doesn't turn a profit for an American bank.

“Adaptation is generally just a bit more challenging to finance compared to mitigation projects, which often the private sector is more willing to invest in ... because there's a better return on investment,” Lauren Stuart, a policy adviser at Oxfam, told Yahoo News in advance of the climate change conference. (A mitigation project is one that reduces climate change, like building electric cars or solar panels.) “Developing countries are really going to be looking for a commitment to significantly scale up adaptation finance.”

In a report released on Monday, the United Nations Environment Program (UNEP) found that there is an enormous shortfall in funding for adapting to climate

change. “As the world looks to step up efforts to cut greenhouse gas emissions — efforts that are still not anywhere strong enough — it must also dramatically up its game to adapt to climate change,” UNEP executive director Inger Andersen said in a statement tied to the report’s release. “We need a step change in adaptation ambition for funding and implementation to significantly reduce damages and losses from climate change. And we need it now.”

THE PRIVATE SECTOR DOESN'T INVEST AT ALL IN 'LOSS AND DAMAGE'

There is a growing movement for reparations for climate change, because some changes will harm people no matter what is done on adaptation. For example, stronger and more frequent hurricanes are already damaging property and destroying lives.

Activists from developing countries say the countries and corporations that got rich by burning fossil fuels should pay back the poorer people and countries getting hit hardest by the result. Some of them refer to this as “loss and damage” to highlight the fact that this is the same principle as saying you should repay your neighbor for damage caused if you dump pollution on their property.

None of the climate finance announcements from Wednesday included funding for this, however.

“It is time to address the needs of those already suffering from irreversible and unavoidable impacts that are beyond the scope of adaptation,” said Ineza Grace, a Rwandan who co-founded the Loss and Damage Youth Coalition, at Thursday’s press conference.

Rich countries still need to cut their own emissions before demanding poor countries cut theirs

The U.S. and U.K. want developing countries such as India to commit to low ceilings on their emissions that would be implemented soon. But rich countries emit far more per person than developing countries, and they have emitted far more historically.

Prakash Kashwan, a political scientist at the University of Connecticut, summarized the view among developing countries for Yahoo News: “About 75 percent of the current stock of accumulated greenhouse gases came from the developed world. They’re the ones that should

be addressing climate change. And, in fact, they should be sort of freeing up some of that space by drastically reducing emissions, but also maybe taking on some of the carbon-removal and carbon-storage kind of responsibilities, so that there is some space for the poorest people in the global South — they can have schools and hospitals, they can grow some food, which actually does release emissions.”

RICH COUNTRIES ARE STILL USING FOSSIL FUELS

“Net zero” means something has no net climate pollution, because every ton of carbon dioxide that is put into the atmosphere would be pulled out, whether by planting trees or by capturing the carbon and storing it somewhere. But fossil fuels cause other problems too: They emit other forms of pollution that contaminate the air and water of communities near where they are burned, and the process of drilling, mining and transporting them can harm the air, water, land and other industries such as fishing, especially when accidents like oil spills occur. Because poorer areas tend to have less political power, they are more likely to have fossil fuels extracted or burned nearby.

Climate justice advocates and representatives of Indigenous peoples at COP26 want all that to end. Instead, they see rich countries promising only to reach net zero 30 years from now, while the mining and drilling keep going on.

“It’s a step in the right direction,” Bineshi Albert, executive director of the Climate Justice Alliance, told Yahoo News in response to Wednesday’s climate finance announcement. “But here’s the challenge: It’s still based on net zero. Those same banks are still financing oil and gas investment. What we’re asking for is divestment from fossil fuels.”

“The U.S. wants to give the impression of climate leadership when, in fact, what it’s doing is advancing U.S. oil and gas interests,” Adow said. For instance, he said, President Biden is touting his commitment to reducing emissions of methane, a potent greenhouse gas, by 30 percent by 2030. Achieving that is only a matter of requiring oil and gas producers to clamp down on methane leaking from wells and pipelines, rather than actually phasing out fossil fuels.

To be fair to Biden, the oil and gas industry would be surprised to hear he is advancing their interests. They opposed his plan to charge a fee for methane leaks. Their lobbying against it helped to get it stripped from his Build Back Better package, and the rule limiting leakage is the most he can do through issuing new regulations.

Of course, getting rid of oil and gas requires political will that the U.S. clearly lacks. Biden couldn't muster the votes in the Senate merely to induce utilities to ditch fossil fuels with financial carrots and sticks, and he's under pressure politically over rising gasoline prices. But from the vantage point of someone on the frontlines of the climate crisis in a country with one-40th the average income of America, that isn't a good reason for their country to sign onto an agreement that doesn't seem fair to them.

Global temperatures are on the rise and have been for decades. Step inside the data and see the magnitude of climate change. ●

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TOMB OF THE UNKNOWNNS WELCOMES THE PUBLIC FOR FIRST TIME IN 73 YEARS

Since 1948, guards have kept tourists and other visitors away from the memorial at Arlington National Cemetery. For two days this month, they will be allowed to get close and place flowers at the tomb.

By Maria Cramer

In 1921, a sergeant walked into a small, dark chapel in Châlons-sur-Marne in eastern France, not far from where French and English troops had pushed back against advancing Germans a few years before.

Clutching a bouquet of red and white roses, the sergeant, Edward F. Younger of Chicago, 23, circled four

caskets that held the remains of American soldiers who died during World War I.

A colonel had ordered him to choose one coffin, which would be placed inside a marble tomb at Arlington National Cemetery and represent all the American soldiers killed during the war.

"I couldn't bring myself to make a hasty choice," he told The Decatur Daily in Alabama in 1935. Sergeant Younger stopped at the coffin third from his right, placed the bouquet on it, saluted and left the room.

"Something seemed to stop me each time I passed that third one's coffin," he said, describing the selection he made on Oct. 24, 1921. "Something seemed to say, 'Pick this one.'"

A few weeks later, the remains were entombed overlooking Arlington National Cemetery in Virginia, where today 4,723 unknown soldiers who died in battles dating to the Civil War are buried, along with more than 400,000 other war veterans.

Since 1948, a 24-hour military guard has kept the public from getting near the white marble sarcophagus. But on Tuesday and Wednesday, people will be able to walk close to the tomb again and place flowers to commemorate 100 years since its dedication.

Many are expected to visit the monument, which has become a sacred site for veterans, as well as visitors who watch the changing of the guard.

The tomb, however, was not always treated with such reverence.

FROM HALLOWED GROUND TO PICNIC SPOT

On Nov. 11, 1921, thousands of people marched to Arlington National Cemetery to watch as the coffin Sergeant Younger had picked was lowered into a marble tomb. In a speech, President Warren G. Harding described how the soldier "might have come from any one of millions of American homes."

"Hundreds of mothers are wondering today, finding a touch of solace in the possibility that the nation bows in grief over the body of one she bore to live and die, if need be, for the Republic," he said.

Chief Plenty Coups, the leader of Crow Nation who was invited to attend the ceremony, laid a war bonnet and a rod known as a coup stick across the coffin.

At first, there were no restrictions on the public's access to the tomb, which visitors could touch and kneel at, said Allison Finkelstein, senior historian at Arlington National Cemetery.

But as the years passed, the hallowed place became more of a public park.

People picnicked around the tomb and even used it as a table for their food. Photographers would linger, offering to shoot photos of visitors, who would sit on it and pose.

At night, couples were discovered "getting excessively romantic on top of the tomb," said Beth Bailey, a professor of history at the University of Kansas.

Such behavior was not unusual at the time, she said.

"Remember that, during the Civil War, people went out on picnics to watch battles," Professor Bailey said.

GUARDING OF THE TOMB AS A SACRED RITUAL

The decision to make one unknown soldier a symbol for those killed and lost in World War I was born in part out of a deep concern that American service members were being left in cemeteries overseas, said Micki McElya, a professor of history at the University of Connecticut and the author of "The Politics of Mourning: Death and Honor in Arlington National Cemetery."

In 1918, Newton Baker, the secretary of war, promised that the dead would be returned home, but the logistics of bringing back thousands of bodies from Europe were overwhelming and threatened to disrupt relations with England and France, whose leaders did not want to shoulder the responsibility of transporting dead American soldiers, she said.

Some military leaders in the United States also felt that "soldiers should rest where they fell," Professor McElya said.

Honoring one unknown soldier helped answer the question of what to do about the lost dead.

But as the tomb became more of a tourist destination and visitors grew unruly, veterans became incensed and demanded protections around it, Professor McElya said.

Initially, a picket fence was placed. Then, a chain-link fence.

It was not until 1948 that the Third U.S. Infantry Regiment, the Army's oldest active-duty infantry unit, was assigned to guard the tomb at all hours and keep visitors away, except for official ceremonies.

The whole site around the tomb came to be "understood as a sacred place deserving of reverential treatment, not meant to be trod on by visitors," Dr. Finkelstein said.

This became especially important in 1958, when crypts holding the remains of unknown World War II and Korean War soldiers were placed at the tomb, she said. The tomb also includes an empty crypt that once held the remains of an Air Force pilot who was killed in the

In recognition of that, the name Tomb of the Unknowns came into common public usage. But the cemetery still uses the original name, the Tomb of the Unknown Soldier. "The name has not changed," said Tim Frank, a historian for the cemetery.

A SOMBER CEREMONY BEGINNING WITH CROW PRAYER

On Tuesday the first people to place flowers at the tomb will be the members of Crow Nation. Their leaders will also recite a prayer that some historical accounts say Chief Plenty Coups gave 100 years ago, according to a spokesman for Arlington National Cemetery.

When Chief Plenty Coups and other Native Americans were invited to attend the ceremony, it was meant to be an acknowledgment by the federal government of "the significant role of American Indians in the military during World War I, and the possibility that the Unknown Soldier could have been an American Indian," Dr. Finkelstein said.

Between 8,000 and 15,000 Native Americans served in the war, she said.

The presence of Chief Plenty Coups was probably the first time that Native Americans were on a national political stage and broadcast to white Americans other

than in Wild West shows, Aaron Brien, the tribal historic preservation officer for the Crow Tribe, said.

His presence also represented “this weird duality that we’re not being treated fairly at all at the time,” Mr. Brien said. “He’s showing the generosity and kindness of Native people, Native people who weren’t even citizens of the country and were living in a time of abject poverty.”

Professor McElya said that many Americans assumed the unknown soldier was a white, heterosexual male. But the mystery of his identity has turned the soldier into a potent political symbol. In 1980, for example, gay and lesbian veterans began laying a wreath at the tomb in a ceremony to honor service members who died in battle.

The tomb helped “Arlington become a site that every single American can claim a relationship to,” Professor McElya said. “The unknown is theirs.” ●

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HOW BEZOS’ LATEST PLAN TO PROTECT FORESTS COULD BACKFIRE

‘We can’t allow ourselves this kind of distraction’

By Justine Calma

Jeff Bezos’ \$2 billion plan, announced last week, to plant trees and restore landscapes across Africa and the US has already raised red flags for some conservation experts and activists. Last year, after he pledged \$10 billion to fight climate change, activists in the US called him out for not doing enough to cut down Amazon’s pollution or work with local communities while crafting his environmental plans. This time, he’s facing similar criticisms on a global scale.

The Bezos Earth Fund announced its latest round of funding on November 1 during a high-profile United Nations climate summit taking place in Glasgow. There

aren’t many details out yet, but the fund says it will funnel \$1 billion towards planting trees and “revitalizing” grasslands in Africa, as well as restoring 20 different landscapes across the US. The other \$1 billion will support sustainable agriculture initiatives.

The hope with the new conservation investment is to preserve ecosystems that naturally draw down and store planet-heating carbon dioxide pollution. That builds on a commitment Bezos made in September to spend \$1 billion to create and manage so-called “protected” areas for conservation. The Bezos Earth Fund also says it wants local communities and Indigenous peoples “placed at the heart of conservation programs.”

“THE WORST-CASE SCENARIO IS THEY DO A LOT OF DAMAGE”

But without safeguards in place, the initiative could potentially harm ecosystems and infringe on local and Indigenous peoples’ rights, some experts say. Instead of flinging money into these projects, they’d rather see Bezos cut pollution from the behemoth businesses he’s founded.

“Organizations like the Bezos Earth Fund have tended to sort of hire people in Seattle to fix Africa. And that doesn’t work,” says Forrest Fleischman, who teaches natural resources policy at the University of Minnesota. “Sort of the best-case scenario [with inexperienced donors] is that they waste all the money, and the worst-case scenario is they do a lot of damage.”

There are heated debates flaring up right now around how to conserve and restore ecosystems. That’s, in part, because of a stream of splashy, new projects to tackle climate change and biodiversity loss. Last year, for instance, the World Economic Forum launched an initiative to plant a trillion trees. That was met with pushback from a cadre of forestry and conservation experts, who warned that aggressive tree-planting campaigns have, at times, led to monocrops of a single species of tree. Those tree farms don’t offer the same kinds of ecological benefits as natural forests that are teeming with diverse species. They might even harm ecosystems by putting a lot of trees where they don’t belong, like in savannas and grasslands.

“Many believe that nothing bad can possibly come from planting trees, but planting trees ...in grasslands and

savannas does irreversible damage to grasslands and savannas,” Rhodes University ecologist Susanne Vetter wrote in an email to The Verge. Environmental groups like the World Resources Institute have mistakenly mapped those ecosystems as degraded forests suitable for tree planting in the past, Vetter wrote in an opinion paper published in the journal *Frontiers in Sustainable Food Systems* in 2020.

The Bezos Earth Fund said that it will work with AFR100, a partnership between 31 governments in Africa that is advised by WRI and aims to restore 100 million hectares of land across the continent by 2030. AFR100 “advocates actively against the conversion of natural ecosystems, like grasslands and savannas, into tree plantations,” a spokesperson said in an email to The Verge. Each country that’s part of AFR100 ultimately makes decisions based on input from experts and local communities, says Bernadette Arakwiye, a research associate for WRI based in Rwanda. The maps Vetter referenced in her paper have been updated and don’t necessarily inform decisions on which lands to restore, according to Arakwiye.

But splashy climate change commitments like the Bezos Earth Fund can easily fall into pitfalls associated with tree planting because of their focus on speed and scale, says Prakash Kashwan, an associate professor of political science at the University of Connecticut. “Designing restoration projects that are environmentally good requires working with each individual landscape based on what the landscape is like,” he says. “If our goal is to learn from indigenous engagements with nature, one fundamental principle is to slow down.”

THERE’S A HISTORY OF “GREEN-GRABBING”

Taking the time to consult with local communities who use the land is also important because projects can also inflame old wounds inflicted upon Indigenous peoples in the name of conservation in the past. There’s a history of “green-grabbing” that’s tied to colonization around the world. Half of “protected” areas around the world occupy lands that were once Indigenous peoples’ homes and territories, according to a 2016 report by former United Nations Special Rapporteur on the Rights of Indigenous Peoples’ Victoria Tauli-Corpuz. After land has been set aside as a protected area, tribes might be

pushed off their lands or could be barred from practicing traditions like hunting, even when done sustainably.

There’s also a history of violent policing of protected areas. The World Wildlife Fund (WWF), for example, funded park rangers accused of killing, raping, and torturing local and Indigenous people at African national parks and wildlife reserves, a 2019 BuzzFeed News investigation found. In 2020, the Bezos Earth Fund awarded WWF \$100 million to protect and restore more lands.

Experts The Verge spoke with have advice for how to avoid repeating the past. “This money should be targeted to wherever, to whatever local communities are already doing and think are the best approaches to [restore landscapes],” says Ida Djenontin, whose research focuses on environmental management and governance at Michigan State University and London School of Economics. Djenontin has also previously collaborated with AFR100. Research has found that forests fare better under the care of Indigenous peoples that depend on them for their livelihoods.

FORESTS FARE BETTER UNDER THE CARE OF INDIGENOUS PEOPLES

Kashwan is concerned that even if the Bezos Earth Fund is serious about wanting to center Indigenous peoples in its conservation programs, meaningful engagement could be hampered in developing nations that lack a strong, existing framework of legal protections for tribes. “These initiatives are fundamentally flawed because all they do is to [make] declarations of good intentions,” Kashwan says. There’s no institutional mechanism for accountability across much of the Global South, he says.

Even in the US, there’s still work to be done to make sure environmental philanthropy efforts are mindful of vulnerable populations. The Bezos Earth Fund says that 40 percent of funds earmarked for the US will go towards projects that “directly engage or benefit underserved communities.” That comes after grassroots activists pushed Bezos to invest more in communities of color disproportionately burdened with pollution. Some of those communities are still fighting for Amazon to clean up the air pollution its warehouses saddle their neighborhoods with.

Experts tell The Verge that perhaps the biggest impact Bezos could have would be to stop the harm Amazon does to the environment through its pollution. Even after making big pledges to tackle climate change, Amazon's greenhouse gas emissions have continued to grow in recent years. As long as that's the case, initiatives like Bezos Earth Fund amount to little more than corporate greenwashing, say experts like Fiore Longo, head of the conservation campaign at Survival International, a human rights organization that advocates for tribal peoples.

Wealthy corporate figureheads, she says, "think they can just keep destroying the planet through producing emissions and then creating protected areas or planting trees somewhere and then magically, their emissions will be compensated for. In the key moment that we are in when we need real decisions for the protection of biodiversity and to stop climate change, we can't allow ourselves this kind of distraction." ●

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'NAZI' REFERENCES A 'DANGEROUS' POLITICAL TREND NOW SEEN IN CT, EXPERTS SAY

By Jordan Fenster

State Rep. Anne Dauphinais in October compared Gov. Ned Lamont to Adolf Hitler, specifically his COVID vaccine policy for state employees and mask mandates.

The Republican, who represents Killingly and Plainfield in eastern Connecticut, later said she would not apologize for the comparison, but wanted to "clarify" what she meant: "He was acting like Hitler in the early 1930s," she said.

"To date, he has not called for putting the unvaccinated in camps," she said of Lamont.

Later that month, the official state GOP twitter account engaged in a back-and-forth about how Nazis

were left wing because they were the National "Socialist" Party.

"The party name was National Socialist," one tweet said. "Are socialists all of a sudden right-wing because you wish it so?"

Experts and advocates say misappropriation of WWII-era terminology is a national trend that has seeped into local politics, one that denigrates the memory of victims of genocide.

"It is actually dangerous to democracy," Quinnipiac University politics professor Scott McLean said. "It trivializes the real historical fact of the Holocaust and Hitler's policies, and leads us to say, 'Oh, well, this is just what politicians do. We don't need to pay attention to this.'"

Avinoam Patt, professor of Jewish studies at the University of Connecticut, called it a form of Holocaust denial.

"If any political agenda can invoke the memory of the Holocaust to its own ends, the facts of what did occur during World War II will become distorted and questioned, eventually eroding memory," he said. "Using the Holocaust to score political points trivializes the systematic persecution and murder of Jews across Europe."

POLITICAL STRATEGY

McLean said comparing mask and vaccine mandates to Nazi Germany is not really about mask and vaccine mandates.

"The strategy behind the comparison of COVID mandates with Hitler is not so much to debate or change the policy today, but to polarize the public in the name of longer-term electoral advantage," he said.

Patt agreed. "When opponents of government mandates invoke symbols like yellow stars, Hitler, the Gestapo and deportation trains, they are manipulating historical memory for political purposes," he said.

"The governor is not Hitler; the government is not marking people with yellow stars; the government is not persecuting and ostracizing a specific group, targeting them for mass extermination," Patt said. "The historical analogy is completely false."

McLean said the ultimate purpose is to rally the political base.

“That keeps the base fired up, so that they'll come out to those rallies, they'll keep tweeting,” he said. “They'll spread these kinds of, you can call them memes or figures of speech, these spread around social media, and they'll vote and they'll also believe things like there's a conspiracy.”

Michael Bloom, executive director of the Jewish Federation Association of Connecticut, said use of Holocaust-era rhetoric to criticize COVID policies “clearly seems to be coordinated.”

“I don't know where it's coming from, but it seems a lot of the wording and the messaging you see among elected and non-elected leaders, community members, congressmen and women seem to be the same messaging,” he said. “There's multiple incidents, so it can't be just coincidence. It's clearly the same set of people pushing the same tropes, pushing the same disinformation.”

‘BOTH-SIDESISM’

Politicians have demonized their opponents for as long as there have been politicians, but McLean said this is not politics as usual.

“When we simply say 'politicians and partisans have always used overheated and hyperbolic rhetoric to denigrate their opponents,' and that this is the same as that, I think that misses the point,” he said. “It trivializes the Holocaust. It says that saying ‘you need to get a shot in order to go to school’ is comparable to the gassing of 6 million Jews in Europe. And it's offensive to the memory of those victims.”

Both Democrats and Republicans have used the specter of WWII-era imagery and terminology to their political ends. “It should have been big news when they called Donald Trump a Nazi, and when they compared Donald Trump to Hitler,” said Ben Proto, chair of the Connecticut Republican Party.

When state Sen. Matt Lesser, D-Middletown, saw people carrying tiki torches at a rally for Virginia governor-elect Glenn Youngkin, he tweeted, “I did Nazi that coming.”

That tweet was deleted. When asked why he deleted the tweet, Lesser said, “because it was dumb,” and he “recognized it was in poor taste pretty quickly.”

“It was a dumb tweet,” he said. “I took it down because it was a dumb tweet.” While he acknowledged that both Republicans and Democrats have made comparisons between modern policies and politicians and those who rose to prominence in 1930s Germany, Bloom said much of the responsibility falls on conservative shoulders.

“President Trump did not create antisemitism or the use of these tropes, but he certainly normalized it and gave it a platform and made it OK to do and say these things,” he said.

McLean said insistence makes all the difference. “Some Democrats have made gaffes and have made this comparison and either apologized or pulled it down,” he said. “But there are Republican politicians who have been doubling down on this. So, it's not just the analogy, it's not just that it came to Connecticut, but it's also the fact that elected officials are in fact, insisting on it and doubling down on it.”

Proto said he would much rather engage in debates over policy. “I hope it stops,” he said. “I don't think it advances the political discourse in a positive way. It doesn't solve any problems, it creates more problems. Both sides seem to think that this is the way to go.”

While McLean warned against what he called “both-sidesism,” he said, “there are reasonable arguments that can be made against mask mandates and vaccine mandates.”

“It is good when a democracy's citizens know history, and can use history to evaluate current political trends,” he said. “Comparison allows us to recognize the emergence of new forms of genocide or anti-democratic trends in the world. However, when opponents of COVID-related mandates compare themselves to the victims of Hitler's genocide, it tends to trivialize the horrors of genocide in our public consciousness.”

NATIONAL AND INTERNATIONAL

Images of vaccine syringes placed in the shape of a swastika have been seen at anti-vaccine rallies, but

McLean said the analogy began long before the coronavirus pandemic.

“This is a trend that has been growing around the country in different places, for at least five or six years. The first time I noticed it was around 2015,” he said. “The foundation had been laid for talking about vaccines in this way that compares vaccine mandates to the Holocaust.”

“This is not something new,” Proto said. “The word ‘Nazi’ has been thrown around for 75 years.” What’s changed, he said, is social media has made this sort of expression easier to proliferate.

“People are more emboldened on social media than they are in person,” Proto said. “We live in a five-second news cycle. It’s easy for people to do or say things that they wouldn’t usually do or say if they were in front of a person.”

McLean called it “red meat for a political base.” “We’ve seen it in social media, and tweets, by various figures on the right, whether they’re elected or whether or not elected,” he said. “Trying to paint the Democratic Party as a socialist party, and also, in some weird twist, trying to also say they are the Nazi Party, because of Democratic leaders’ support for vaccine and mask mandates.” Though it may spread online among fringe groups, such discourse then makes its way into mainstream channels, both nationally and locally, Patt said.

“Holocaust deniers and antisemites are finding it easier than ever to spread their hateful ideologies online,” Patt said. “This creates a toxic stew of antisemitic stereotypes, images, and ideas that have been deployed by fringe groups, and have now begun to seep into our mainstream political discourse.”

According to Patt, the result is an overall increase in hate speech, and a proliferation of extremism. “In many cases, Holocaust distortion serves as a bridge to other forms of hate proliferating online, including virulent antisemitism, conspiracy theories like QAnon and the Protocols [of Zion], hate speech, in chat rooms and social media, science skepticism, a general distrust of democratic institutions, and more,” he said.

The end result, he said, is often physical violence. “What starts with hateful words, discrimination, and online attacks, can end in extreme violence. We have

seen this in Charlottesville, the synagogue shooting in Pittsburgh, the mosque shootings in Christchurch, New Zealand, and beyond,” Patt said. “Extreme rhetoric leads to extreme violence.” ●

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'VICE PRESIDENTS JUST DON'T BREAK THROUGH.' WHY ARE KAMALA HARRIS' APPROVAL RATINGS LOWER THAN BIDEN'S?

By Phillip M. Bailey and Maureen Groppe

WASHINGTON – Vice President Kamala Harris’ latest poll numbers aren’t just bad, they’re late-night comedy-fodder bad.

ABC late-night host Jimmy Kimmel mock-pondered last week how Harris’ job approval rating could be even lower than President Joe Biden’s, when “she basically has nothing to do.”

“It’s like criticizing a backup quarterback,” Kimmel said. “Tom Brady is OK. I don’t love the way Blaine Gabbert has his legs folded on the bench.”

The problem for Democrats, however, is that Harris, 57, is very much the backup for the 78-year-old Biden and expected to try to succeed him if he doesn’t seek a second turn.

And as the first woman, Black American and South Asian American to serve as vice president, there’s also been extra scrutiny of how she handles the role.

Only 28% of registered voters participating this month in a USA TODAY/Suffolk University poll approved of her job performance.

Biden’s job approval rating, while still bad, was 10 percentage points higher.

WHY ARE HARRIS' RATINGS LOW?

She's the No. 2 in the Biden administration and her boss's numbers are not good.

Vice presidential favorability and job approval ratings are overwhelmingly influenced by how the president is doing, according to a 2017 study by political scientist Jody Baumgartner.

There's no reason to think that's changed with Harris, despite the historic nature of her vice presidency, he said.

"I think there's plenty of people who don't know who she is, and even if they do, they have no idea what she's doing or what she's not doing," said Baumgartner, who teaches at East Carolina University. "Vice presidents just don't break through."

Vice presidential scholar Joel Goldstein said any vice president would want higher poll numbers than Harris has. But the current polarization of politics "probably limits the ceilings of presidents and vice presidents in ways that wasn't once the case," he added.

"As the Democrats begin to focus on the programs involved in Build Back Better and the infrastructure bills and as vaccination rates improve," he said, "presumably Biden's and Harris' numbers will improve."

Andra Gillespie, a political scientist at Emory University, said it cannot be overstated how Harris' low ratings are anchored to Biden's drastic decline in popularity. His public support fell 14 percentage points between June and mid-October, according to Gallup.

Ultimately, she said, it is the president who is responsible for steering the ship.

"This administration is going to rise and fall on the decisions that Joe Biden makes," Gillespie said. "And so Kamala Harris can't be the scapegoat every time Joe Biden has a bad day."

WHY IS HARRIS' JOB APPROVAL RATING WORSE THAN BIDEN'S?

One reason Harris isn't getting numbers as high as Biden is due to a noticeable dip among Democrats in general, and especially from African Americans, a major constituency.

Eighty-three percent of Democrats approve of Biden's job performance compared with 63% who approve of the job Harris is doing, according to the poll.

Likewise, 72% of Black voters give Biden high marks versus 51% of the same voting bloc who likes Harris' job performance.

"Black voters for Kamala Harris should be in the 80%-90% approve," said David Paleologos, director of the Suffolk University Political Research Center. "Those are numbers that have got to be higher."

Further down the tabulations, the survey shows liberals like what Biden is doing significantly more (81%) than they approve of Harris' performance (56%).

Those differences are at least twice the spread of Biden's 10 percentage point advantage among all voters.

President Joe Biden acknowledges Vice President Kamala Harris during a press conference in the State Dining Room at the White House on Nov. 6, in Washington. The president spoke after his Infrastructure bill was finally passed in the House of Representatives after negotiations with lawmakers on Capitol Hill went late into the night.

President Joe Biden acknowledges Vice President Kamala Harris during a press conference in the State Dining Room at the White House on Nov. 6, in Washington. The president spoke after his Infrastructure bill was finally passed in the House of Representatives after negotiations with lawmakers on Capitol Hill went late into the night.

Why isn't Harris doing better among Black voters?

Ricky L. Jones, chairman of Pan-African studies at the University of Louisville, said besides visibility, the vice president is also weighed down by a significant bloc of Black progressive-minded voters who soured on Harris – and parts of her record as a California prosecutor – during her failed presidential bid.

"I think the 'Kamala is a cop' analysis and a number of other things showed her to be a brazen and opportunistic political animal," Jones said. "And it is something that worries anybody who actually pays attention to politics and pays attention to her career."

The "Kamala is a cop" meme was used by many left-leaning activists, who hammered Harris in 2019 for her

time as a prosecutor at a time when progressives were leaning into criminal justice reform.

Harris exited the race in December 2019 just before the Iowa caucuses, following reports of division within her campaign, struggles to raise campaign cash and plummeting poll numbers.

In her home state of California, for instance, a July 2019 poll of likely Democratic primary voters put her in first place with 19%, but by September. Harris had plunged to 8%, according to the Public Policy Institute of California.

"I think if she runs for president in the next cycle, I think she gets beaten in the primaries again," Jones said. "I don't think she'll get traction."

Evelyn M. Simien, a University of Connecticut political science professor, said Harris' historic status as vice president will always be tied by some Black voters to her past role in the criminal justice system and the racial implications of that debate.

"There's no sort of getting around it when it comes to her current role as VP," she said.

Simien adds how there is a sentiment that Harris is being trotted out as a prop while the administration has done little of substance for Black voters.

"There could be criticism leveled against her, is she symbolizing sort of a mammy figure?" she said. "You know, for Black women, is she reduced to nothing more than a symbol?"

Months after taking office Biden gave his vice president two significant issues to lead – addressing the root causes of migration at the southern border and protecting voting rights.

But in the Washington wilderness, those issues have borne few fruits.

"African Americans want deliverables," Simien said. "And we see no progress with regard to voting rights."

ARE THERE OTHER REASONS HARRIS' JOB APPROVAL RATING IS WORSE THAN BIDEN'S?

Yes. The good news for Harris is that, unlike with Biden, many voters are still forming an opinion of her.

About 1 in 5 respondents are unable to rate her job performance. By contrast, only 3% of those surveyed don't have an opinion of how well Biden is doing.

Among Black, white and Hispanic voters, African Americans are the most likely to be undecided about how she's doing. Twenty-eight percent of Black voters didn't have an opinion compared with 20% of whites and 16% of Hispanics.

WHAT ABOUT DISAPPROVAL RATINGS?

Biden's 51% job disapproval rating is 8 percentage points worse than Harris', and his 58% unfavorability rating is 5 points worse.

The fact that Biden's positives and negatives are both higher than Harris' could again be a reflection that he is better known.

"VPs are less visible than presidents, and accordingly more people are apt not to have an opinion about them," said Goldstein, the vice presidential scholar.

IS IT COMMON FOR PEOPLE TO NOT HAVE AN OPINION ON THE VICE PRESIDENT?

Very.

When Suffolk University conducted a poll in late 2017 and asked voters about Vice President Mike Pence, 21% did not have an opinion.

At the start of Vice President Al Gore's final year in office, 10% of those surveyed by Gallup could not identify him.

In a 2008 survey, 15% could not name Vice President Joe Biden. When he was in his fourth year as President Barack Obama's vice president, one survey showed 21% could not identify him, according to the 2017 study on vice presidents.

Paleologos, the pollster, said the survey reflects how people don't know what Harris is doing or what her role is in the administration.

"He's the face of the Biden administration," Paleologos said. "She's not. That's what it boils down to."

"She's in a no-win situation in that she's going to be judged by lower job approval as long as she doesn't

have a role that she can sink her teeth into, that people will identify her with, with a successful outcome," he added. "Obviously, immigration and border control is not working, and that's the only visibility, really, that she has."

IS IT COMMON FOR THE VICE PRESIDENT'S RATINGS TO BE BELOW THE PRESIDENTS?

Pence's favorability rating was very close to Trump's the seven times Suffolk University polled on that question in 2017 and 2018. Pence's unfavorability rating, however, was much better than Trump's.

Seven months into Obama's presidency, Obama's favorability rating was much higher than Biden's and his unfavorable score was slightly lower, according to a Gallup survey.

During the first seven years of the George W. Bush administration, the president's favorability rating averaged seven points better than Vice President Dick Cheney's score, according to Gallup.

From 1993 through 2000, Americans' perceptions of President Bill Clinton and Gore were generally similar, Gallup reported. The exceptions were a 1994 poll in which Gore did significantly better and two readings in the second term when there were larger-than-normal gaps between the two.

IS HARRIS' FAVORABILITY RATING BETTER THAN HER JOB APPROVAL NUMBER?

Yes, but not that much better.

The dismal 34% who view her favorably is also lower than Biden's 39%, although the difference is not as large as when respondents were asked about job performance. And 12% were undecided, compared with 3% who did not have a favorable or unfavorable view of Biden.

Simien, the University of Connecticut professor, said that could represent how Harris remains well-liked among Democrats and their base versus how those same voters view what she's accomplished thus far.

"I do think there's a difference between sort of a favorability rating and cultural pride versus approval

and disapproval," she said. "In terms of job performance, we really don't see her other than standing alongside (Biden) with her hands folded."

Vice President Kamala Harris takes a photo with supporters after speaking during a vaccine mobilization event at the TCF Center in downtown Detroit on July 12.

Vice President Kamala Harris takes a photo with supporters after speaking during a vaccine mobilization event at the TCF Center in downtown Detroit on July 12.

WHICH VOTERS GIVE HARRIS THE HIGHEST RATINGS?

When voters are broken out by sex, age, race, party and where they live, the only groups that give her a job approval or favorability rating above 50% are Democrats, Blacks and Hispanics.

IS THAT DIFFERENT FOR BIDEN?

No.

WHICH VOTERS GAVE HARRIS THE LOWEST RATINGS?

Republicans (2% approval), 65-plus voters (17% approval), independents (19% approval), whites (20% approval) and men (22% approval).

IS THAT DIFFERENT FOR BIDEN?

No.

For example, only 2% of Republicans approve of either Biden's or Harris's job performance. But Biden did poll at least 8 percentage points higher than Harris among independents (28% approval), whites (28% approval), 65-plus voters (28% approval) and men (31% approval).

WHAT ABOUT WOMEN?

Women voters give higher marks to Biden (44% job approval) than Harris (34% job approval), but the 10 percentage point difference is the same as the split among all voters.

ARE RACISM AND SEXISM A FACTOR?

Experts who study race and politics say Harris's role as the first woman of color to ascend to the vice presidency can't be overlooked in how she's being viewed but that there's more to why her numbers are in the dirt so early.

"I think it's lazy analysis if you do not include race and gender in this exploration," Jones, the University of Louisville professor, told USA TODAY. "But I also think it's lazy analysis if you restrict it to race and gender in this exploration."

Gillespie, the Emory University political scientist whose research focuses on post-civil rights leadership in African American politics, said given Harris' historic nature, any polling on the current vice president warrants a deeper examination before supporters or critics jump to conclusions.

"There does need to be given serious consideration about the ways that bias are influencing how she is perceived publicly," Gillespie said.

"She can't change who she is. She can't change the body that she inhabits. So we have to consider the ways that her race and gender are factoring into evaluations of her."

IS THE MOST RECENT POLL AN OUTLIER?

On average, Harris holds a 41% favorable and 52% unfavorable rating across surveys conducted since the Biden administration took office, according to poll tracking by the Los Angeles Times.

That's better than the 34% favorable and 53% unfavorable rating in the USA TODAY/Suffolk University poll.

But it's about 4 points worse than Pence at this point, according to the LA Times tracker. It is also 18 points worse than Biden when he was vice president; 52 points worse than Cheney; and 39 points worse than Gore.

WHAT DO WE KNOW ABOUT THE POLL?

This survey of 1,000 registered voters was conducted between Nov. 3-5. It was taken by landline and cellphone and has a margin of error of plus or minus 3.1 percentage points. ●

RETHINK STANDARD WEIGHT-LOSS TREATMENTS TO IMPROVE OBESITY OUTCOMES FOR BLACK WOMEN

Black women remain underrepresented in weight-loss intervention studies and typically lose less weight compared with white women, but tailored interventions and engagement strategies can increase chances of success, according to a speaker.

CDC data show Black women have the highest obesity prevalence in the United States compared with other groups and are the only race and sex subgroup with an obesity prevalence greater than 50% of the overall population, Loneke Blackman Carr, PhD, RD, assistant professor in the department of nutritional sciences at the University of Connecticut Institute for Collaboration on Health, Intervention and Policy, said during a presentation at ObesityWeek 2021. About 57% of Black women are living with obesity, and by 2030, severe obesity will increase particularly among women and among non-Hispanic Black adults, Blackman Carr said.

Blackman Carr is an assistant professor in the department of nutritional sciences at the University of Connecticut Institute for Collaboration on Health, Intervention and Policy.

"With Black women sitting at the intersection of both of these identities, they are certainly at a special point of concern as we see that severe obesity will increase," Blackman Carr said. "There is a historic present but also a future need to focus on obesity solutions for treatments, and hopefully also prevention, to abate this trend."

CREATING TAILORED INTERVENTIONS

Lifestyle change through behavioral modifications, as shown in trials like Look AHEAD and the Diabetes Control and Complications Trial, are efficacious;

however, there are differences in effectiveness by race and sex. Diversity among trial participants is also low, Blackman Carr said.

“Much of the work we do as behavioral intervention scholars is predicated on the success we have seen in those efficacy trials, but there is a difference in weight loss, particularly when it concerns Black women,” Blackman Carr said.

Apart from tightly controlled randomized controlled trials for weight loss, Black women consistently lose less weight — about 2% to 3% total weight loss — compared with white women across intervention studies, Blackman Carr said.

“We know our goal is to reach clinical significance of 5% to 10% [weight loss]; however, Black women are only losing a small amount, and we are not reaching that goal that we know confers the health benefits we hope to achieve through weight loss,” Blackman Carr said.

As an alternative, weight-gain prevention as a treatment modality could abate continued weight gain and stem obesity trends among Black women, Blackman Carr said. She cautioned that more evidence on weight-gain prevention is still needed.

“Weight-gain prevention has a relatable and digestible message for Black women,” Blackman Carr said. “This focus on keeping your same weight, or weight stability, is particularly salient for this group. We know this because aesthetic, cultural values do have a preference toward curvier, shapelier frames. The goal is not always to become slim.”

FUTURE DIRECTIONS FOR SUCCESS

The contextual or lived experiences of Black women are often not considered in behavioral weight-control approaches, Blackman Carr said. Alternatives to cognitive behavioral therapy, such as acceptance-based behavioral treatment, have been associated with above-average weight loss and could increase engagement among Black women in particular, Blackman Carr said.

Researchers should also examine other less-used techniques, such as social comparison, to accompany the typical tools of self-regulation, social support and self-monitoring. Building interventions that can use digital modalities, especially smartphones, could

provide a relevant pathway to engage Black women in weight-control interventions.

Additionally, racism and racialized experiences should be measured and assessed among trial participants, even if such factors seem irrelevant to a study, Blackman Carr said.

“We need to understand that gap in disparity and why Black vs. white women are not losing as much weight. What is taking place within that lived experience?” Blackman Carr said. “Just understanding these variables — where people live, what their environment contains — can help us engage in the behaviors we promote.”

‘RECRUIT AND RETAIN’ BLACK WOMEN

Black women continue to be underrepresented in most trials, particularly in the weight-gain prevention space, Blackman Carr said. Trialists and researchers must recruit and retain Black women to support the statistical analyses needed to learn more about which treatments work, she said.

“It is important to learn not just what might be in the way, but what facilitates behavior change, too,” Blackman Carr said.

To increase diversity in studies, the makeup of professional team and staff should reflect the population that is recruited.

“Is our staff diverse? Do we have folks creating the intervention connected with the community they represent?” Blackman Carr said. “That is how we can make a difference in recruitment and retention. Being engaged will be a helpful and relevant strategy for having Black women in studies.”

Any intervention must also consider the lived experiences and cultural needs of Black women for success, she said.

“By continuing to innovate in this space as we have, while needing to make further strides, we can achieve weight loss that is at least clinically significant as a common standard for Black women. That is our goal,” Blackman Carr said. ●

CONNECTICUT'S 'TIME OF RECKONING' WITH A COLONIAL HERO'S HORRIFIC PAST

By Mark Pazniokas

A commission responsible for the restoration and preservation of the state Capitol was asked Thursday to return a verdict: Is John Mason, a founder of the Connecticut Colony, guilty of a 17th Century war crime and unworthy of contemporary honor?

A marble statue of Mason stands in a niche high above the north steps of the Capitol, clutching a sword and gazing over Bushnell Park. To its right, a stone carving depicts the attack he led against a fortified Pequot village in 1637.

Historians say 400 Pequots were massacred, including 175 women and children, many burned to death when the village was set afire. English soldiers and Mohegan and Narragansett allies fired on those who fled the flames, eradication the goal.

"Under today's standards, John Mason would be charged with war crimes and prosecuted accordingly," said Rodney Butler, chairman of the Mashantucket Pequots. "I ask you: Is this a man who we should celebrate in this great state of Connecticut?"

Over two hours, historians, an anthropologist, members of the Mohegan, Eastern Pequot and Mashantucket Tribes and one descendant of Mason took turns talking about racism and erasure, the complexities and horrors of the Pequot War, and the opportunities and necessity of finding meaning in history. Some appeared by Zoom, others in person at the Legislative Office Building. Butler's message came in a recorded video.

The state historian, Walter Woodward, recommended Mason remain in his niche, his presence an opportunity to teach visitors and remind the leaders who work in the Capitol about a bloody history that resonates through the centuries.

"As state historian, I believe history and the future are both best served by embracing the complex realities of Connecticut's past, rather than by simplifying or erasing them," Woodward said. "That past is filled with injustice, pain, inequity and violence. Our present moment has become a time of reckoning with these painful realities."

Native Americans should take their place in some of the eight empty niches on the Capitol, and interpretive signage can inform tourists and other visitors about the conflict accompanying the arrival of Europeans, first the Dutch traders and trappers and later the English colonists, Woodward said.

"I believe we need a solution that preserves rather than erases the stark lessons of the Pequot War, lessons both from the war itself and from the people who memorialize that war in statuary three centuries later," Woodward said. "As the state historian, my charge is to help foster such conversation among all of Connecticut's citizens."

At issue is not just the history of 1637 but the animus towards Native Americans when the Capitol opened in 1879 and when the statue of Mason was dedicated in 1908. The Indian wars of the West still were fresh, largely ending with the massacre of Lakota warriors at Wounded Knee in 1890.

Also on the Capitol, a stone relief depicting the attack John Mason led on a fortified Pequot village in 1637. It is titled, "Attack on an Indian Fort."

Mitchell Ray, chairman of the Eastern Pequot Tribal Nation, noted that another statue of Mason was erected in 1889 on the Mystic village site in Groton. At the time, he said, the battles with Indians in the West defined American culture.

"They paint a picture of the American psyche. 'Americans need to tame the land and get rid of the Indian.' When we talk about a cultural anthropological climate, we can view all of us that are gathered here today as a shift in the atmosphere from the 1800s to make a positive, long-lasting change," Mitchell said.

The Pequots were the dominant tribe when Europeans arrived, subjugating other tribes who would join the English in the Pequot War.

Marcus Mason Maronn, a descendant of Mason, furiously defended his ancestor and criticized the

Indians who define him by one act and ignore that the massacre came during a war against a fearsome foe.

“They refuse to recognize that this statue on the Capitol represents John Mason for his entire career as a dedicated public servant and as the preeminent founder of the Connecticut Colony, that this symbol is sacred for many people, and is simply not a symbol of genocide that they obsess about,” Maronn said.

He did not come to the commission to make amends or be diplomatic to the Pequots in the audience.

“They can’t handle the truth,” he said. “Again, they were the aggressive and dominant tribe who tortured, killed and subjugated their own race of people even before the Europeans came here,” he said. “They were the ones who intended to annihilate all the colonists to maintain their hegemony. Pity for them that the situation got flipped around. And as some people would say, they got what they deserved, and still remain sore losers.”

Manisha Sinha, a University of Connecticut professor of 19th century U.S. history, said she is a veteran of debates about the fate of statues memorializing Confederate leaders as well as founding fathers who owned slaves.

“I have advocated for the taking down of statues that commemorate Confederate leaders and generals, who I see as traitors to the American republic, fighting for the worst cause in American history, as General Grant put it, in the cause of human bondage,” Sinha said. “On the other hand, I have opposed the taking down of statues of some of our founding fathers, revolutionary figures who did not defend slavery as a positive good.”

Sinha said history can be complex, and great men of history can be flawed.

“The Mason massacre is not a complex story,” she said. “It was a sheer massacre of non-combatants and of women, children and elders. We cannot excuse this by pointing to internecine warfare among Native Americans.”

Mason’s statue is not necessary to teach history, she said.

“I think it is high time that you think of removing John Mason’s statue,” Sinha said. “It cannot be contextualized. We do not remember history by

statues, especially not in the monumental 19th century forms. We actually end up commemorating people, making them heroic.”

The State Capitol Preservation and Restoration Commission is scheduled to next meet on Dec. 14, when a vote is expected on whether to fill a niche at the Capitol with a new statue or empty one. ●

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STUPID TURKEYS? SCIENTISTS SAY THAT THE UNFAIRLY MALIGNED BIRD MAY ACTUALLY BE STUFFED WITH SMARTS

Despite their reputation, turkeys are highly intelligent birds with unique, under-appreciated evolutionary quirks

By Matthew Rozsa

here is an old myth about turkeys that never seems to die. The basic premise is this: Every time there is a rainstorm, turkeys will turn their heads upward out of curiosity to observe the drops as they fall. Because they are reputed to be unintelligent, the folk tale says the turkeys will remain in this position even after it has become difficult to breath. Eventually, the turkeys will drown. The moral, it seems, is that turkeys are literally too dumb to survive.

While there is exactly zero scientific evidence supporting this belief, it underscores the larger cultural stereotype that turkeys are not very bright. It is hard to blame anyone for reaching this conclusion: Turkeys are, admittedly, a ridiculous-looking (and sounding) animal, with their necks pressed against their bodies, their ungraceful gaits and their "gobble gobble"-sounding cluck.

Yet if you want to feel less guilty about chowing down on a juicy gravy-covered drumstick on Thanksgiving, you can't use the premise of turkey stupidity to do so. The

science makes it clear that turkeys are actually pretty smart.

"Turkeys probably can't do multivariable calculus or explain string theory, but then neither can most people I know (me included)," Christopher Elphick, an ornithologist at the University of Connecticut, told Salon by email. "At one level, any organism that can survive and thrive in a constantly changing environment that they have little control over, as turkeys often do, must be doing something right."

Elphick's observation about surviving and thriving while one's environment changes is crucial. When measuring intelligence, cognitive scientists emphasize an organism's ability to effectively adapt to its surroundings, not human-centric activities like reading a book or solving an algebraic equation. In other words, it is a mistake to dismiss turkeys as "stupid" because they can't do tasks that humans must perform — but it would be rational to draw that conclusion if, for instance, they did indeed drown themselves whenever it rained. Yet turkeys have proved quite adept at surviving amid changing conditions, perhaps more so than a bipedal species that is currently overheating the planet.

PROGRESS BAR

"Turkeys may not have the problem solving skills of crows and ravens, but I'm reluctant to call them stupid," Krakauer wrote to Salon. "They can survive in all sorts of habitats, including cities, and make use of a huge range of different types of food. They have to do all this while navigating a complex social world. Turkey hunters will be quick to tell you how wary they can be during hunting season."

That said, if you've ever seen a squashed turkey as roadkill, you'll know that turkeys struggle with manmade environmental changes completely outside their sphere of understanding. This speaks not to "stupidity," but the simple fact that wild turkeys had no reason to ever need to comprehend something as complex as traffic.

Of course, domesticated turkeys aren't necessarily more intelligent for the experience. As Krakauer put it, there is a "night and day" difference between wild and domesticated turkey intelligence. Wild turkeys live in large ranges where older birds teach the younger ones

how to flourish with a wild, unfettered lifestyle. Domesticated turkeys, by contrast, are stuffed into crowded quarters and bred to be docile.

"Many of the early wild turkey management projects failed because they used genetically wild turkeys that were raised on farms and then released, and these weren't able to gain enough survival skills to make it," Krakauer recalled. "Wildlife biologists realized they had to catch already savvy wild adults and move them so the new stock would have those wild behaviors to pass along."

One of those wild behaviors is the ability to form complex social structures. In this respect, wild turkeys are not dissimilar from humans. They both crave interactions and approval from other members of their species, and they rely on building teams in order to achieve immediate day-to-day needs.

These traits are not limited to merely forming rudimentary groups; turkeys have sophisticated social structures that they rigorously enforce.

"Males and females form separate flocks during the non-breeding season," Elphick explained. "Within these flocks there are well defined social hierarchies — usually pretty stable in the female flocks, less so in the male flocks." Elphick noted that this hierarchical behavior in poultry is where humans get the concept of a "pecking order."

Turkeys seem to embrace their various roles based not just on their relevant physical characteristic (size, speed, and so on), but also on their "personalities." As Elphick pointed out, researchers are finding more and more evidence that individuals in various bird species have "personalities" of their own. As one example, some individuals in a species will be more or less likely to take risks, such as visiting a bird feeder when a human being is close by.

"Turkeys can certainly learn that it is safe to come in to feeders, and I have friends who have birds show up at a regular time every day as though they are ready to have the feeders filled — a sign of intelligence," Elphick observed.

Krakauer also gave an example of turkey intelligence that involves a characteristic one does not usually associate with birds — putting one's immediate self-interest aside in favor of the long view. Reflecting on

male turkey behavior during mating season, Krakauer described how turkeys who are brothers or half-brothers "sometimes form teams to cooperatively court and defend females." Their strategy is to make sure that a turkey hen breeds with a victorious member of their group; even though only one of them gets to breed, "the others benefit by passing on more of their genes through their successful brother than they would if they tried to go it alone."

Does this mean that one shouldn't eat turkeys during Thanksgiving? Obviously this is a matter of personal preference — Krakauer said that he still enjoys eating turkey, while Elphick is a vegetarian — but, at the very least, it is illogical to do so on the grounds that turkeys are somehow too stupid to have lives that even matter. As Ingrid Newkirk, president of People for the Ethical Treatment of Animals, wrote to Salon, "wild turkeys are smart enough to find their way, to avoid many predators, to diligently protect their brood, to find food in the forest, and can fly up to 55 miles per hour and run up to 25 miles per hour. They haven't a house with plumbing but they keep themselves impeccably clean by taking dust baths and preening their feathers meticulously."

In other words, turkeys are definitely more complex than the Thanksgiving-friendly stereotype would want you to admit. ●

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IT'S TIME TO STOP DEMONIZING "INVASIVE" SPECIES

Climate change is forcing some animals to move. Don't call them "invasives."

By **Marina Bolotnikova**

Marine ecologist Piper Wallingford was doing fieldwork on the rocky shore of Laguna Beach, California, in 2016 when she noticed a dime-sized creature she'd never seen before. It was a dark unicorn snail, a predator that

drills into mussels and injects an enzyme that liquefies their flesh. "Then," Wallingford explains, "they basically suck it out like soup."

The animal is native to the Mexican state of Baja California, Wallingford later learned, and it's been migrating up the coast over the last few decades in search of new habitat, eating into local mussel populations along the way. It's also one of countless species around the world — from white-tailed deer to lobsters to armadillos to maple trees — that are moving with the climate.

Ecologists expect climate change to create mass alterations in the habitats of these "range-shifting" or "climate-tracking" species, as they're sometimes called, which will reshuffle ecosystems in ways that are hard to predict. The migrations are critical to species' ability to survive hotter temperatures.

The scientific community largely views this kind of habitat shift as a good thing, Wallingford and other ecologists told Vox. But the primary lens available to the general public and to policymakers is less forgiving. "Invasive species" is a concept so ingrained in American consciousness that it's taken on a life of its own, coloring the way we judge the health of ecosystems and neatly dividing life on Earth into native and invasive.

A 2018 Orange County Register story on Wallingford's work, for example, called the dark unicorn snails "climate invaders." "I think any time you introduce this idea of a new species, there's sort of this inherent reaction of, 'Oh, that's bad, right?'" Wallingford says. But she encouraged local stakeholders not to try to remove them.

For decades, invasion has been a defining paradigm in environmental policy, determining what gets done with limited conservation budgets. Species deemed invasive have often been killed in gruesome ways. Even though invasion biologists readily point out that many non-native species never become problematic, the invasion concept almost by definition makes scientists skeptical of species moving around. But a growing community of scientists and environmental philosophers now question whether a concept defined by a species' geographic origin can capture the ethical and ecological complexities of life on a rapidly changing planet. In the 21st century, there's no such thing as an undisrupted ecosystem, and this will only become truer as climate

change and habitat loss accelerate. It's crucial that we get this right.

Range shifts have "been a real problem for the hardcore invasion biologists to deal with," says Mark Davis, a biology professor at Macalester College and a critic of the invasion framework.

In a controversial recent paper published in *Nature Climate Change*, Wallingford and a team of co-authors argued that the tools of invasion biology — for example, looking at a species' impact on local food or water sources, or figuring out if it's encountering prey that aren't used to predators — could be adjusted to understand the impacts of range-shifters.

LISTEN TO UNEXPLAINABLE

Unexplainable is a weekly science podcast about everything we don't know. For stories about great scientific mysteries, follow us wherever you listen to podcasts.

The proposal got "a lot of pushback," says Wallingford, who doesn't necessarily oppose the "invasion" lens. Detractors said that merely linking climate-tracking species with invaders taints them by association. Range-shifters ought to be seen "not as invasive species to keep out, but rather as the refugees of climate change that need our assistance," University of Connecticut ecologist Mark Urban argued in a comment published in the same journal issue.

Climate change and the range shifts it's causing are extraordinary circumstances. If a species flees a habitat that is burning or melting, is it ever fair to call it invasive? Even outside of a climate context, this tension reflects a more fundamental problem within the invasive species paradigm. If the label is so stigmatizing that the only appropriate response feels like extermination, perhaps something else needs to take its place.

THE ORIGINS OF "INVASIVE" SPECIES

"Invasive species" might feel like a firmly established scientific category, but invasion biology, which studies the impacts of non-native species, is a relatively young field.

British ecologist Charles Elton drew attention to non-native species in his 1958 book *The Ecology of Invasion*

by Animals and Plants, arguing that there is a place, or niche, for every species on the planet where they've evolved to survive. Those that move, he believed, should be removed.

Even before that, "There were people who recognized invasions and remarked in great detail on them," including Charles Darwin, says University of Tennessee ecologist Daniel Simberloff, one of the originators of invasion biology. It wasn't until the 1980s, Simberloff says, that it cohered into a subfield of scientists talking to each other and looking at invasions as a general phenomenon.

Invasion biologists aren't opposed to the presence of all non-native species — many of them are innocuous, some are even beneficial. A widely accepted rule of thumb says that about 10 percent of species introduced into new ecosystems will survive, and about 10 percent of those (so, just 1 percent of all non-natives) will cause problems that lead them to become "invasive." Some can do real harm, such as threatening vulnerable endemic species. Feral cats in Australia, for example, are thought to be a major driver of extinctions of small mammals.

Invasion biology became entangled with politics as its influence grew. In 1999, then-US President Bill Clinton signed an executive order establishing the National Invasive Species Council. It defined an invasive species as a non-native species "whose introduction does or is likely to cause economic or environmental harm or harm to human health." Simberloff, who advised in drafting the order, says the White House added the "economic" component to that definition — which often amounts to harming agribusiness. "There are introduced species that have some substantial impact on some agricultural crops that don't really have much of an impact on anything else," he says. "Many scientists wouldn't worry about them."

Combining commercial and environmental concerns in the "invasive" category can make it sound as though threats to the bottom line of a business are tantamount to an ecological problem. This is particularly troublesome considering some businesses — industrial monocropping or cattle farming, for example — that are protected against invasive species by federal and state management programs are themselves hugely harmful to biodiversity. Scientists on both sides of the invasive species debate agree this conflation is problematic.

Common starlings, for example, a species of bird native to Europe and parts of Asia and Africa, have become wildly successful as an introduced species in North America. They're blamed for hundreds of millions of dollars in agricultural damage annually in the US, often eating grains in cattle feedlots, says Natalie Hofmeister, a PhD candidate in ecology and environmental biology at Cornell University. "That's like a treasure for the starlings," she says. The USDA Wildlife Services poisoned 790,000 of the birds in fiscal year 2020. While starlings have long been thought to harm native bird species, which might sound like a more scientific rationale for killing them, Hofmeister says the literature isn't settled on whether that is true.

THE INVASION MODEL HAS A NATIVIST BIAS

Some conceptions of invasive species' harms are questionable.

For example, invasives can be considered a threat not only by killing or outcompeting native species but also by mating with them. To protect the "genetic integrity" of species, conservationists often go to extraordinary lengths to prevent animals from hybridizing, environmental writer Emma Marris points out in her book *Wild Souls: Freedom and Flourishing in the Non-Human World*. Consider the effort in North Carolina to prevent coyotes from breeding with endangered red wolves, which bears uncomfortable parallels to Western preoccupations with racial purity that only recently went out of fashion.

That's why some scientists look askance at the influence of invasion biology and argue that the field has a baked-in, nativist bias on documenting negative consequences of introduced species and preserving nature as it is. Invasion biology is like epidemiology, the study of disease spread, biologists Matthew Chew and Scott Carroll wrote in a widely read opinion piece a decade ago, in that it is "a discipline explicitly devoted to destroying that which it studies."

Historically, the term has erroneously expanded to the idea of, "'If you're not from here, then you are most likely going to be invasive,'" Sonia Shah, author of *The Next Great Migration: The Beauty and Terror of Life on the Move*, said on a June 2021 episode of *Unexplainable*, Vox's science-mysteries podcast. Conservation policies have been crafted around the

idea that if something is not from "here" — however we define that — "then it is likely to become invasive, and therefore we should repel it even before it causes any actual damage," as Shah says, which is part of the nativist bent that pervades ecological management.

What's more, the very notion of "invasion" draws on a war metaphor, and media narratives about non-native species are remarkably similar to those describing enemy armies or immigrants. For example, a recent news story in the *Guardian* about armadillos "besieging" North Carolina described them as "pests" and "freakish." It also gawked at the animal's "booming reproduction rate," an allegation that, not coincidentally, is leveled against human migrants.

Many scholars have explored how anxieties about humans and nonhumans crossing borders, or going places where they don't "belong," map onto one another. "The fear of immigration is never isolated to humans," writes science studies scholar Banu Subramaniam in *The Ethics and Rhetoric of Invasion Ecology*. "It includes nonhuman migrants in the form of unwanted germs, insects, plants, and animals."

A "curse word" that harms entire species

One important set of interests isn't considered in invasive species management at all: those of the "invasives" themselves. Arian Wallach, an ecologist at the University of Technology Sydney who is well known for her criticism of invasion biology, calls invasive species "nothing less and nothing more than a curse word" used to demonize species and exclude them from moral consideration. She first began to question invasion biology after she moved for her PhD to Australia, which has some of the most militant invasive species management programs in the world, aimed at protecting the country's own unique species.

"I started seeing conservationists blowing up animals with bombs, shooting them from helicopters, poisoning them, spreading diseases through them," she says. Australia has shot feral goats, camels, deer, pigs, and other animals from the sky (a method also used in the US), and the country kills many small mammals with 1080, a poison that is widely regarded as causing an extremely painful death. Invasion biology, Wallach believes, is "a bad idea that's had its run."

Wallach's own research looks at how dingoes, dog-like animals that are thought to have been brought to the

continent thousands of years ago, can control the populations of more recently introduced cats and foxes that eat some of Australia's iconic marsupial species, such as the eastern barred bandicoot. Her work serves as a proof of concept for "compassionate conservation," a movement that opposes the mass killing of some animals in an attempt to save others. A core tenet of this framework is to value animals as individuals with their own moral value, rather than just a member of a species.

It might seem, then, that there's a trade-off between caring about animals as individuals and caring about them in the context of species and ecosystems, but Wallach argues it's more complicated. Bias against non-natives doesn't just harm individuals; it can harm entire species.

In a 2019 study, Wallach and a team of researchers pointed out that non-native species are excluded from world conservation goals. This creates situations where, for example, a species like the hog deer, a small deer native to South Asia, is endangered in its home range but hunted and treated as feral in Australia. Using a sample of 134 animals introduced into and out of Australia, the team found that formal conservation counts significantly underestimated their ranges, and that 15 of them could be downgraded from "threatened" or "near threatened" status if their non-native ranges were counted. For many endangered species, non-native habitats can be part of the solution, providing refuge to wildlife that can no longer survive in their native ranges.

A BROADER MOVEMENT WANTS TO SEE BEYOND THE INVASION LENS

If we try to think outside the invasive species framework, what else can we look to?

Indigenous knowledge is increasingly being recognized as essential to conservation, write Nicholas Reo and Laura Ogden — Dartmouth University professors of Indigenous environmental studies and anthropology, respectively — in an ethnographic study of Anishinaabe perspectives on invasive species. (The Anishinaabe are a group of culturally related First Nations peoples in the Great Lakes region of Canada and the US.) Anishinaabe ideas, Reo and Ogden found, reflect a worldview that sees animals and plants as belonging to nations with their own purposes and believes people have the

responsibility to find the reason for a species' migration. The authors' sources recognized parallels between the extermination of species deemed invasive and the dark history of colonial violence against Indigenous peoples. The interviews "helped me recognize the ways in which different philosophies of the world shape our ethical response to change," Ogden says.

Life is "extremely adaptable and regenerative and dynamic," Wallach says. "Go back 10,000 years, and it's a completely different world. Twenty thousand years, it's different. A million, 2 million, 500 million ... There is no point that things aren't shifting and moving."

Another scientific idea that captures this notion is "novel ecosystems," or, as environmental journalist Fred Pearce has termed it, "the new wild": ecosystems that have arisen, intentionally or not, via human introduction.

In Tierra del Fuego, at the tip of Chile and Argentina, a particularly dramatic novel ecosystem is taking shape. In 1946, beavers were introduced there in a futile attempt to create a fur industry. Instead, the animals proliferated and munched down the region's Nothofagus — southern beech — forests, creating dams and ponds. "They are these miraculous world builders," says Ogden, who wrote an essay imagining the beavers not as invaders, but as a diaspora. (Beavers have also been a boon for ducks and other marine species.) The invasive species paradigm, Ogden adds, is devoid of nuance, history, and politics; she prefers a concept that gives expression to the moral complexity of the beavers' presence in South America, as well as the fact that they had no choice in being moved there.

WHY ARE THERE HIPPOS IN COLOMBIA?

The beavers should ultimately be removed from the forested areas, Ogden believes, though she doesn't think we can do so with a clear conscience, and says eradication "seems very unlikely." But the idea of a diaspora opens up a way of thinking about what we owe the beavers, as opposed to how to expel them. After 75 years in South America, don't the animals have a claim to living there? What right do we have to exterminate them?

I posed this question to Daniel Simberloff, the prominent invasion biologist. "I don't believe they're endangering any of the Nothofagus species," he

acknowledged, noting that there hasn't been enough study to know what impact the beavers are having on species that require the southern beech forest habitat. Still, "I think it's a disaster that this native ecosystem is being destroyed and replaced by pastures of introduced plants," Simberloff says. "Other people may not agree with me."

DEAD TREES STAND ALONG A STREAM NEAR USHUAIA, ARGENTINA

Dead trees, caused by beavers introduced to the area from Canada in 1946, stand along a stream near Ushuaia, Argentina, on the southern edge of Tierra del Fuego in November 2017. Mario Tama/Getty Images

Even when it's packaged as objective science, conservation always entails value judgments. One might say that the deaths of 100,000 beavers should count as a "disaster" just as much as the demise of an old-growth forest. Conservationists will have to choose whether to meet ecosystem disruptions like this one with the "war machine" of invasion biology, as Ogden calls it, or to come to terms with a changing world.

For now, the dark unicorn, the thumbnail-sized snail that caught marine ecologist Piper Wallingford's eye, continues inching up the coast of California. "The question of how they're getting from one site to another is still one that we can't answer," Wallingford says.

There is something humbling in seeing other species' will to survive in an interconnected world undone by climate change. Though the dark unicorns' movements elude our understanding, they already know where they need to go. ●

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NO TIME FOR A WRITING GROUP?

By Ann N. Amicucci and Sarah E. DeCapua

We've all heard the research productivity mantras that float around academe: write daily, even if you have only

15 minutes. Ensure you have projects operating at multiple stages of a research pipeline. And don't forget to participate in a writing group for accountability.

Those strategies work well for many academics, and with good reason: they're tried-and-true methods to engage in ongoing, systematic production of scholarship. But what about those of us whose work lives are less, shall we say, systematic? As we struggle to balance complex teaching, service or administration workloads or serve as caregivers to others, it's unlikely we can engage in a daily writing practice or commit time to an accountability group.

The two of us tried for years—and failed—to reproduce the lockstep writing and accountability processes we'd read about. And then in a workshop on research productivity, writing coach Kathleen Vacek invited us to reflect on how we could dip our toes into an accountability relationship. Did we have time for more meetings or supporting multiple writers in a group? No. But could we send a few emails? Yes, that we could manage.

So for more than a year now, we've been communicating about our research goals through weekly email. At each week's start, Sarah emails Ann her goals for the week, and Ann replies with her own. At the week's end, Ann emails a recap of what she accomplished, and Sarah replies in turn. Each semester, we start a new email chain. Keeping our goals modest, focusing on wins and allowing for change has made our process successful—and here's what we've learned.

Be realistic. We each had sizable long-term goals for the year—book chapters and articles to write, conference presentations to deliver, a book to edit for one of us, and new data to collect for the other. But week to week, we set manageable goals to make it more likely we'd reach them.

We followed Cathy Mazak's advice to break projects into one-hour tasks to ensure we avoided nebulous plans like "finish article." In some weeks, our goals were measured in time: to spend two hours on research or to touch a project on three separate afternoons. In other weeks, goals were measured in deliverables: to send important research emails, request library resources or change a manuscript's citation style.

Modest weekly goals meant we regularly earned small wins; they also helped us plan ahead. When our weekly

calendars were particularly heavy with meetings and teaching obligations, we set smaller goals rather than pretend we'd have more time for research, only to be disappointed later.

Be flexible and honest. When we began our accountability process, we expected to achieve what we considered to be manageable goals. But we quickly discovered that wouldn't always be the case. If working with students has taught us anything, it is that sometimes life gets in the way of our best intentions, so flexible deadlines and changeable priorities are occasionally needed.

We also found that we became as accountable for not meeting our goals as we did for meeting them. It was in sometimes falling short that we found the value of honesty and friendship. In a writing group with acquaintances, we might be tempted to impress colleagues or reluctant to admit what we viewed as failure. But being friends made it easier to be honest with each other when we didn't or couldn't meet our goals.

ROUNDUP OF 2021 HIGHER ED BOOKS

Such an admission invited the other one of us to offer encouragement—which could provide the window for meeting the goal in the following week instead. Being candid about not meeting goals also allowed us to view the next week's goals with an authentic understanding of our priorities.

Stay positive. Being equally accountable to unachieved goals as we were to achieved ones proved valuable, as each of us encountered stretches of time when we didn't meet our goals due to work or personal challenges. During those weeks, we were tempted—often successfully—to feel frustrated with failure. We reminded each other that not reaching goals is part of the accountability process and that a period of time when scholarship takes a back seat to administrative or teaching responsibilities is temporary. It will pass, and we'll return shortly to the research. We focused on the positive: the goals that we'd already accomplished during a semester or an academic year, not the goals that we hadn't met in a particular week. That strategy allowed us to see the accountability process evolve from recaps that merely noted what we accomplished in a week to acknowledgments of circumstances or situations that challenged us. Positivity also provided

the opportunity to lift each other up with encouragement and keep moving forward in our commitment to ourselves and each other.

Recognize unexpected benefits. We thought our accountability process would be a checklist of accomplished tasks, but we ended up helping with and learning from each other's research and writing processes. When Ann had a manuscript desk rejected, Sarah helped parse the editor's feedback and identify how to revise it before sending it out again—support Sarah could offer because she had followed the project from when Ann began data collection. Conversely, when Sarah was invited to propose an edited book, Ann helped brainstorm ideas for the collection—support Ann could offer because she was familiar with Sarah's previous scholarship that led to the invitation.

We advised each other on research methods and passed along articles relevant to each other's work. We also offered professional advice on department politics and teaching when those contexts shaped and began to impose on our research work. Ultimately, supporting each other's processes helped us deepen our own. We were no longer writing in a void, unsure of whether other scholars faced the same hurdles we did. We had real-time evidence of how another person encountered and made it past such hurdles, and we could draw on each other's strategies to bolster our own work. Create community. Interested in starting your own email accountability process? First, find a partner who shares your goals and priorities. It doesn't matter if your research areas overlap. What matters is that you share a vision for what you hope to gain from the accountability process.

Second, find out if your institution has an account with the National Center for Faculty Development & Diversity. If so, sign up for Monday Motivator emails and check out the center's webinars on writing productivity for small doses of helpful advice you can access at any time. Like many academics, we can't reasonably write every day or participate in a time-intensive group. Yet in Mazak's view, accountability isn't the issue. She argues that what we really need is community: the support of others while we navigate the process of holding ourselves accountable to writing and research excellence. And, indeed, it is not fear of having to report failures in our email chain that drives us to engage with our scholarship. It's the encouragement found in our friendship—the fact that

we each have a research cheerleader who will support us no matter how much we accomplish—that keeps us moving forward. ●

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ON DECEMBER 10, 2021

HOW CONSPIRACY THEORIES IN THE US BECAME MORE PERSONAL, MORE CRUEL AND MORE MAINSTREAM AFTER THE SANDY HOOK SHOOTINGS

By Amanda J. Crawford

Conspiracy theories are powerful forces in the U.S. They have damaged public health amid a global pandemic, shaken faith in the democratic process and helped spark a violent assault on the U.S. Capitol in January 2021.

These conspiracy theories are part of a dangerous misinformation crisis that has been building for years in the U.S.

American politics has long had a paranoid streak, and belief in conspiracy theories is nothing new. But as the news cycle reminds us daily, outlandish conspiracy theories born on social media now regularly achieve mainstream acceptance and are echoed by people in power.

As a journalism professor at the University of Connecticut, I have studied the misinformation around the mass shooting that took place at Sandy Hook Elementary School on Dec. 14, 2012. I consider it the first major conspiracy theory of the modern social media age, and I believe we can trace our current predicament to the tragedy's aftermath.

Nine years ago, the Sandy Hook shooting demonstrated how fringe ideas could quickly become mainstream on social media and win support from various establishment figures – even when the conspiracy

theory targeted grieving families of young students and school staff killed during the massacre.

Those who claimed the tragedy was a hoax showed up in Newtown, Connecticut, and harassed people connected to the shooting. This provided an early example of how misinformation spread on social media could cause real-world harm.

A woman in a red shirt sits among a group of people and holds a photo of a young boy.

Francine Wheeler displays a photograph of her son, Sandy Hook Elementary shooting victim Ben Wheeler, at a 2018 gun control rally. Kena Betancur/AFP via Getty Images

NEW AGE OF SOCIAL MEDIA AND DISTRUST

Social media's role in spreading misinformation has been well documented in recent years. The year of the Sandy Hook shooting, 2012, marked the first year that more than half of all American adults used social media.

It also marked a modern low in public trust of the media. Gallup's annual survey has since showed even lower levels of trust in the media in 2016 and 2021.

These two coinciding trends – which continue to drive misinformation – pushed fringe doubts about Sandy Hook quickly into the U.S. mainstream. Speculation that the shooting was a false flag – an attack made to look as if it were committed by someone else – began to circulate on Twitter and other social media sites almost immediately. Far-right commentator and conspiracy theorist Alex Jones and other fringe voices amplified these false claims.

Jones was recently found liable by default in defamation cases filed by Sandy Hook families.

Mistakes in breaking news reports about the shooting, such as conflicting information on the gun used and the identity of the shooter, were spliced together in YouTube videos and compiled on blogs as proof of a conspiracy, as my research shows. Amateur sleuths collaborated in Facebook groups that promoted the shooting as a hoax and lured new users down the rabbit hole.

Soon, a variety of establishment figures, including the 2010 Republican nominee for Connecticut attorney

general, Martha Dean, gave credence to doubts about the tragedy.

Six months later, as gun control legislation stalled in Congress, a university poll found 1 in 4 people thought the truth about Sandy Hook was being hidden to advance a political agenda. Many others said they weren't sure. The results were so unbelievable that some media outlets questioned the poll's accuracy.

Today, other conspiracy theories have followed a similar trajectory on social media. The media is awash with stories about the popularity of the bizarre QAnon conspiracy movement, which falsely claims top Democrats are part of a Satan-worshipping pedophile ring. A member of Congress, U.S. Rep. Marjorie Taylor Greene, has also publicly denied Sandy Hook and other mass shootings.

But back in 2012, the spread of outlandish conspiracy theories from social media into the mainstream was a relatively new phenomenon, and an indication of what was to come.

NEW BREED OF CONSPIRACIES

Sandy Hook also marked a turning point in the nature of conspiracy theories and their targets. Before Sandy Hook, popular American conspiracy theories generally villainized shadowy elites or forces within the government. Many 9/11 "truthers," for example, believed the government was behind the terrorist attacks, but they generally left victims' families alone.

Sandy Hook conspiracy theorists accused family members of those killed, survivors of the shooting, religious leaders, neighbors and first responders of being part of a government plot.

Newtown parents were accused of faking their children's deaths, or their very existence. There were also allegations they were part of a child sex cult.

This change in conspiratorial targets from veiled government and elite figures to everyday people marked a shift in the trajectory of American conspiracy theories.

Since Sandy Hook, survivors of many other high-profile mass shootings and attacks, such as the Boston Marathon bombing and the Charlottesville car attack, have had their trauma compounded by denial about their tragedies.

And the perverse idea of a politically connected pedophile ring has become a key tenet in two subsequent conspiracy theories: Pizzagate and QAnon.

The kind of harassment and death threats targeting Sandy Hook families has also become a common fallout of conspiracy theories. In the Pizzagate conspiracy theory, the owners and employees of a Washington, D.C., pizza parlor alleged to be part of a pedophile ring that included politicians continue to be targeted by adherents of that conspiracy theory. In 2016, one man drove hundreds of miles to investigate and fired his assault rifle in the restaurant.

Some people who remain skeptical of the COVID-19 pandemic have harassed front-line health workers. Local election workers across the country have been threatened and accused of being part of a conspiracy to steal the 2020 presidential election.

The legacy of the mass shooting at Sandy Hook is a legacy of misinformation – the start of a crisis that will likely plague the U.S. for years to come. ●

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TWEAKS TO U.S. CHRISTMAS TREES COULD HELP THEM SURVIVE CLIMATE CHANGE

International species and selective breeding methods are helping to preserve the evergreen tradition

By Nikk Ogasa

Mounting pressure from extreme weather events and lethal diseases—both exacerbated by climate change—threatens to assail U.S. Christmas tree-growing regions and slash production. To help defend these cherished trees and the farms that raise them, researchers are mapping conifer genomes and exploiting the natural characteristics of species that grow outside the U.S. to identify and breed hardier evergreens.

“In agriculture, you’re not doing what you were doing 30 years ago,” says Gary Chastagner, a plant pathologist and Christmas tree expert at Washington State University. “It’s an ever-changing thing.”

Most U.S.-produced Christmas trees are grown and shipped from two regions. In the East, the Blue Ridge Mountains of western North Carolina yield the most trees. These cold peaks are home to the prized Fraser fir, a high-elevation species known for its strong branches, ideal conical shape and superior ability to retain its needles after being cut down. Meanwhile, the Pacific Northwest produces the largest numbers of Christmas trees overall, with Oregon leading the nation. The Cascade Range’s cool and damp western flanks offer ideal growing conditions for conifers, such as the stiff-branched noble fir and densely needled Douglas fir, two of the country’s most popular Christmas tree species.

This June a record-breaking heat wave scorched the Pacific Northwest, with temperatures soaring past 99 degrees Fahrenheit for four consecutive days. This hit Christmas tree farms hard, killing many younger trees and singeing the needles of older ones. “We lost probably close to 60 percent of our seedlings,” says Bob Schaefer, CEO of Oregon-based Noble Mountain Tree Farm. One of the country’s largest such operations, it typically produces more than half a million evergreens a year.

To recoup losses, Schaefer and his colleagues plan to plant more seedlings in the spring and delay harvesting of damaged, older trees, giving them a couple years to recover. Though Schaefer is confident this will mitigate losses from the June heat wave, he notes that not all growers can afford to replant many seedlings or delay harvesting full-grown trees—and that the heat all but wiped out some smaller growers. And if devastating weather events become more frequent, as some climate scientists expect, larger-scale growers may increasingly find themselves struggling to cope.

This summer’s Pacific Northwest heat wave was a once-in-1,000-years event that would have been “virtually impossible without human-caused climate change,” according to a report published earlier this year by an international consortium of scientists. If global carbon emission levels continue as they have, the team concluded, by the 2040s such extreme heat

events could hit the region every five to 10 years—roughly the time it takes to grow a Christmas tree.

Extreme heat is not the only problem growers face. Most Christmas tree farms rely on natural precipitation rather than irrigation; thus young seedlings, which lack the extensive root systems that help older trees reach deep groundwater stores during dry periods, are particularly vulnerable. But if too much rain saturates the soil, conditions are ripe for the spread of lethal disease. When pore spaces in soils fill with water, they open up navigable channels for the fungal spores of a water mold called Phytophthora. These passages let the spores suddenly swim through soil and attack trees’ root systems. There is no effective treatment; afflicted trees wilt and die.

Phytophthora root rot is the most devastating infection Christmas trees face. Each year it causes North Carolina growers to lose an estimated \$6 million to \$7 million in trees. Scientists are now predicting warmer temperatures, and more frequent intense rainfall events, if climate change goes unchecked. This means Phytophthora, which thrive under warm and wet conditions, will likely develop into a bigger problem in the future, Chastagner says.

To address such challenges, scientists are studying conifer genomes in the hopes of developing trees with greater resilience to disease or climate change. Marker-assisted breeding—which involves selecting for specific genetic landmarks associated with desirable traits—could help researchers quickly handpick and breed trees with characteristics such as drought resilience (such traits are more difficult and time-consuming to detect using more conventional methods). Christmas tree cultivators also might one day be able to use markers to select for faster growth, longer needle retention, or needles that are unappetizing to deer.

But locating these markers is no easy task in light of the sheer size of conifer genomes, says Jill Wegryzn, a computational biologist at the University of Connecticut. “They’re about eight times the size of the human genome,” she says. Researchers are probably more than five years away from being able to use genetic markers to help growers produce better trees, Wegryzn adds. After mapping the genetic makeup, scientists will still need to investigate which genes are activated to make proteins.

Additionally, some botanists are looking into naturally acquired climate and disease resilience in non-U.S. Christmas tree species. Scientists have found that species including the Nordmann fir (the most popular Tannenbaum in Europe), Turkey's aptly named Turkish fir, and Japan's momi fir possess greater natural resistance to Phytophthora than domestic species such as the Fraser or noble fir. Trials are underway to verify similar resistance in Trojan firs, another Turkish species. Some of these species are also more resistant to insects and pests, and more tolerant to warmer climates and drought, Chastagner says.

Certain botanical tweaks could make these international species more attractive to U.S. consumers. Chastagner and his colleagues are gathering branches from trees as young as two years old, and testing thousands together to identify those that retain the most moisture and drop fewer needles after harvesting. The results will help U.S. growers accelerate the development of overseas trees with better post-harvest needle retention.

Growers are eager to take advantage of this research. Native species like the Fraser fir and noble fir still reign supreme on the U.S. market, but species from other parts of the world are becoming increasingly popular with growers here, Chastagner says. Many farmers across the country, including Schaefer, are already cultivating and selling Nordmann firs. "And right now there's a tremendous increase in Turkish fir production," Chastagner says.

Non-U.S. species are unlikely to wholly replace the most popular native species, he says. Still, these alternatives offer growers more options for coping with climate change. Farmers growing trees in poorly drained soils that are particularly susceptible to root rot can elect to grow species with greater natural resistance to the disease.

In the coming years, buyers will likely encounter an increased diversity of tree species from around the world when they go to pick out their holiday evergreen, Chastagner says, adding that "consumers are going to have more choices."

So despite the changing climate, evergreen trees could continue to grace our homes for many Christmas seasons to come. ●

WHAT'S THE POINT OF HOLIDAY GIFTS?

By Dimitris Xygalatas

Whether it's the dread of a trip to an overcrowded shopping mall, the challenge of picking out the right gifts, the frustration over delivery delays or the hit to the wallet, shopping for holiday gifts can be stressful.

What's the point of it all? Shouldn't the holiday season simply be about family, friends and food? And wouldn't everyone just be better off spending their own money on things they know they want?

Gift exchanges may seem wasteful and impractical. But as social scientific research reveals, the costs and benefits of gift-giving aren't what they seem.

THE KULA RING

During his fieldwork in Papua New Guinea, anthropologist Bronislaw Malinowski documented an elaborate tradition practiced by the Massim people. These island communities maintained a complex ceremonial exchange system that revolved around the gifting of shell necklaces and shell armbands. Each gift first passed between individuals and then traveled between islands in a circle that became known as the "Kula ring."

These artifacts had no practical utility or commercial value. In fact, selling them was strictly forbidden by custom. And since the objects were always on the move, their owners rarely wore them. Nonetheless, the Massim took long journeys to exchange them, risking life and limb as they navigated the treacherous waters of the Pacific Ocean in their wobbly canoes.

This hardly seems like an efficient use of time and resources. But anthropologists realized that the Kula was instrumental in cultivating human connection.

Individually, these gifts were not really free; they came with the expectation of repayment in the future. But on the whole, they served to create a cycle of mutual responsibilities, resulting in a network of reciprocal relationships encompassing the entire community.

THE GIVING EFFECT

Similar exchanges exist in societies around the world. In many parts of Asia, gift-giving is an integral part of corporate culture. Just like for the Massim, those symbolic gifts facilitate business relations.

In much of the Western world, one of the most familiar contexts is the custom of exchanging holiday presents. On occasions such as Christmas, Hanukkah or Kwanzaa, many families spend considerable time, effort and money on buying presents for their loved ones.

Looking at it through the lens of cold logic, the practice seems wasteful. Everyone has to pay for someone else's stuff. Some gifts end up going unused or returned. If no one gave presents, everyone might be better off spending their money and time according to their own needs and desires.

However, psychological research suggests otherwise.

Studies show that spending money on others feels better than splurging on ourselves. In fact, neuroscientists have found that making a donation makes the brain's reward circuitry light up more than receiving a gift. Moreover, the joy of giving a gift lasts longer than the fleeting pleasure of accepting it.

By exchanging presents, we can double-dip, spreading feelings of gratitude all around. Besides, as families and friends know one another's tastes, preferences and needs, chances are that most people will end up receiving what they wanted in the first place, with the added bonus of bringing everyone closer together.

WEAVING WEBS OF CONNECTIONS

Ritualized sharing occurs not only within but also between families. Think of birthday parties, weddings or baby showers. Guests are expected to bring a present, often of significant value. Both they and their hosts often keep track of the value of those presents, and receivers are expected to reciprocate with a gift of similar value when the opportunity presents itself in the future.

This exchange serves multiple functions. For the hosts, it provides material support, often during challenging transitional periods such as starting a new family. And for guests, it is like investing money into a fund, to be used when their time comes to become hosts.

Moreover, the gifts help raise the symbolic status of the givers along with that of the receiver, who is in position to organize a lavish ceremony partly or wholly funded by the guests. Most importantly, these exchanges help build a network of ritual bonds between families.

Similar practices even extend to politics: When diplomats or leaders visit a foreign country, it is customary to exchange presents. French officials often hand out bottles of wine, while Italian leaders are known to give fashionable ties.

Other diplomatic gifts may be more unusual. When President Richard Nixon visited China in 1972, Chairman Mao Zedong sent two giant pandas, named Ling-Ling and Hsing-Hsing, to the National Zoo in Washington, D.C. The U.S. government reciprocated by sending two oxen to China.

From the shells exchanged by Pacific islanders to the toys and sweaters placed under Christmas trees, sharing has always been at the center of many ritual traditions. This is fundamentally different from other forms of material exchange, like trade or barter.

For the Massim, exchanging a shell necklace for a shell armband is not the same as trading yam for fish, just as giving a birthday present is not the same as handing a cashier money to purchase groceries.

This speaks to a more general rule of ceremonial actions: they are not what they appear to be. Unlike ordinary behaviors, ritual actions are nonutilitarian. It is this very lack of obvious utility that makes them special. ●

THIS 10-WEEK INTERVENTION CAN REDUCE THE SEVERITY OF DEPRESSIVE SYMPTOMS, SHOWS NEW PSYCHOLOGICAL RESEARCH

By Mark Travers

A new article published in the *Journal of Psychopathology and Behavioral Assessment* suggests that a 10-week activity-based treatment for depression, called the Brief Behavioral Activation Treatment for Depression, can significantly reduce the severity of depressive symptoms. It works by aligning a person's behavior with their core values.

"People with depression find it difficult to engage with their routines and activities that were previously pleasant or rewarding," says Jerin Lee, a psychologist at the University of Connecticut and lead author of the research. "When people withdraw and isolate, they lose opportunities to be rewarded and reinforced with pleasant activities, which can exacerbate their depression. Brief Behavioral Activation Treatment for Depression (BATD) is a behavioral-based therapy that focuses on increasing engagement with meaningful and values-based activities through strategies such as activity scheduling and self-monitoring to counter depressive symptoms."

To give an example, BATD might help someone understand and clarify one of their core values, such as being a caring and available friend. Once one's values are clarified, BATD helps guide the selection of activities that support those values. So, for someone who values being a caring friend, activities recommended by BATD might be (1) texting a friend, (2) checking in with a friend once per week, or (3) letting a friend know that he/she is thinking about them twice per week.

Prior research has found BATD to be an effective treatment for depression among certain high-risk

populations such as cancer patients. However, less is known about how people in the general population respond to BATD.

To fill this gap, Lee and her team recruited 42 general population adults with depression and 38 healthy individuals to complete the 10-week BATD treatment. They measured individuals' levels of depression, anxiety, dysfunctional attitudes, and mindfulness at three points in time: before the treatment began, after the 10-week treatment ended, and three months after the treatment ended.

Not surprisingly, the clinical group reported greater depression, anxiety, and dysfunctional attitudes, and less mindfulness than the healthy control group before the treatment began. However, at post-treatment, the clinical group reported significant decreases in depressive symptoms such that their results were statistically equivalent to the healthy control group. At the three-month follow-up, the clinical group reported minor increases in depressive symptoms, but still showed improvements compared to where they were prior to doing the 10-week intervention.

"Our results suggest that many individuals struggling with depression may benefit from BATD," says Lee.

The authors hypothesize that Brief Behavioral Activation Treatment for Depression works by improving individuals' dysfunctional attitudes and mindfulness.

"Engaging in activities like those found in BATD could reduce dysfunctional attitudes, or negative thoughts about oneself, the outside world, and the future, which is a risk factor for depression," says Lee. "Engaging in activities could also increase mindfulness — or the receptive attention to and awareness of internal and external experiences as they occur — which is a protective factor for depression."

The authors hope their research inspires more individuals to seek out treatment for depression.

"Depressive symptoms may seem insurmountable, like a downward spiral that pulls you into a vortex of hopelessness and sadness," says Lee. "But every action and intention counts. When you engage in activities — like meaningfully connecting with friends, creating art, exercising — that bring you joy and align with your values, it can result in an upward spiral that can pull you

out of the vortex. The effects of the positive activities will compound and there is hope.” ●

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TO SAVE DEMOCRACY, RECOMMIT TO PRINCIPLES OF THE RULE OF LAW AND HUMAN RIGHTS AT HOME

By Glenn Mitoma

The fascist riot at the U.S. Capitol is a fitting denouement of the Trump Presidency. His incitement of thousands of white supremacists, conspiracy theorists, and others caught in the thrall of his cult of personality demonstrated once and for all that there is nothing he won't do to cling to power – and nothing some won't do to keep him there.

Whether by the 25th Amendment, a second impeachment, or the inexorable approach of January 20, Trump's presidency is ending. But for the United States to recover from this near miss with a Trump dictatorship, we must commit to rebuilding our democracy on a foundation of accountability, truth-telling, and human rights.

That Congress reconvened to certify the Electoral College vote after the building was cleared is a relief. Likewise, the recent refusal of military leaders to entertain Trump's reported fantasies of declaring martial law to preserve his rule, and the relative efficiency with which courts across the country have dismissed the meritless lawsuits brought to challenge the election results, are heartening. But the impunity with which the mob was allowed to ransack the Capitol building is a mirror image of the impunity with which, for four years, the President has assaulted our democratic institutions. Defeating Trump at the ballot box and expelling the mob is not enough.

Seventy-five years ago, Americans recognized that defeating the fascism of Adolf Hitler required more than

a military victory; it also required the reassertion of the rule of law on a global scale through the International Military Tribunal at Nuremberg. U.S. Supreme Court Justice Robert Jackson led the Allies effort to hold the Nazi leadership to account for war crimes, crimes against peace, and crimes against humanity. “That four great nations, flushed with victory and stung with injury stay the hand of vengeance and voluntarily submit their captive enemies to the judgment of the law,” Jackson said in his epic opening address, “is one of the most significant tributes that Power has ever paid to Reason.”

Reasserting the rule of law within the United States requires not only rejecting the outlandish claims of election fraud, but also holding Trump and other officials accountable for the abuses of power, corruption, and possible crimes they may have committed. As with Nuremberg, President-elect Joe Biden's Justice Department can demonstrate that even “men who possess themselves of great power” are not above the law.

But we will need to go beyond prosecutions for wrongdoing to gain a full understanding of what has transpired under the Trump administration. President-elect Biden has suggested that his presidency will inaugurate a time of “healing” for the United States. Lessons from post-authoritarian societies, like post-Apartheid South African's Truth and Reconciliation Commission, show that this process of healing must begin with a full accounting of the devastating impact of the Trump era. Doing so will not only ensure that Trump and his accomplices are not allowed to “get away with it,” but also will open the process of national truth-telling.

Finally, a clear lesson of the past four years has been that we need to deepen our institutional commitments to realizing human rights—another lesson of the post-WWII period. While Jackson prosecuted Nazi crime, Eleanor Roosevelt led the fledgling United Nations in drafting the Universal Declaration of Human Rights.

Far too long, Americans have regarded fascism and other threats to human rights as something only other countries have to worry about. To build a broader democratic culture, we will need to bring human rights home. Domestic human rights organizations, which have been calling for establishing a non-partisan human rights commission, could take leadership in drawing upon both domestic and international norms to develop

a platform to strengthen civic engagement and democratic practices that are key to resisting authoritarianism.

Supporting the rule of law by holding officials accountable, constructing an accurate account of the recent past, and recommitting to human rights at home are essential to restoring the confidence in government that underlies our shared national life. Such work can help create a new sense of community, which is a fundamental aspect of a healthy democracy. ●

School of Nursing

PANDEMIC GIVES LOCAL NURSING STUDENTS CRASH COURSE IN THEIR PROFESSION

By Kate Fogg

ORONO, Maine — Kennedy Gerow, 22, of Carmel was in her final semester of nursing school at the University of Maine in March 2020. Though she had completed the bulk of her clinicals — supervised hands-on medical training for students — Gerow considered herself more of a nursing student than an actual nurse.

As the coronavirus crept its way toward American shores, murmurs throughout the nursing department signaled to final-year nursing students that they may be plucked to join the fight in area hospitals.

Gerow was terrified.

Lauren Ismail, 20, a second-year nursing student living in Orono, was in the early days of her very first clinical rotation. Students had to wear masks, but things were otherwise normal. There were more restrictions the second week, and by the third, clinicals were moved entirely online.

Heidi Placella, 20, also a second-year nursing student at the time who goes to the University of Connecticut and is living in Storrs, Connecticut, realized that nurses were going to play a large role in fighting the coronavirus before it had reached the United States. In fact, one of her nursing professors had altered a course to cover the coronavirus starting in February 2020.

The three women all grew up in Glenburn. They and other nursing school students and recent graduates faced many of the same risks of exposure to the deadly coronavirus as their more seasoned counterparts, yet their experiences were different.

Gerow's nursing degree would be fast-tracked along with many of her classmates' — she graduated on April 28, 2020, instead of in May. She didn't get to have the pinning ceremony that she had always imagined, where

her older brother — also a nurse and the reason she pursued nursing — would pin her.

By June, after receiving a CNA certification based on completed clinical hours, Ismail would be working on a med-surgical floor at a Bangor hospital. She was living with her parents and caring for her grandmother who suffers from COPD. She worried about the exposure risk she brought home to them after every shift. Even still, she continued to work. Quitting wasn't an option.

Gerow was thrust into her nursing career full of doubt regarding potential gaps in training that could have resulted from her unprecedented final semester.

"I was really scared because I didn't know what it was going to mean," Gerow said. "I didn't feel ready to be a nurse in a pandemic."

She nearly lost a patient during her first "rapid response." Gerow was one month out of orientation and the patient was having a heart attack. As Gerow manually squeezed the intravenous bag of pain medication, the patient begged her not to let them die.

She has heard this a few times, and it can bring her close to tears. Though she doesn't want to make a promise she can't guarantee, sometimes she will tell them, "you are right where you need to be, and we are going to do everything we can to help you."

On a particularly difficult day, when Gerow's floor was being used as a partial COVID-19 unit, she remembers walking to her car in tears and considering leaving the bedside. She has chosen to stay for now.

"Nursing is a team sport." Gerow said. Though she hardly knows the faces of some of her coworkers, the bond between them is tangible. What they go through together brings them together.

DECEMBER 2020

Gerow received her first dose of the Pfizer vaccine on Dec. 18, 2020. She was one of the first nurses on her floor to receive a vaccine, and after working on the front lines for nine grueling months of the pandemic, it had been long awaited.

She felt nervous at first — the vaccine was brand new — but she understood it as her duty to get it.

At the time she was working with vulnerable patients on a Cardiac/COVID-19 Unit at a Bangor hospital. Gerow told her boss when she started to experience muscle aches. They attributed the aches to the vaccine, but monitored her symptoms and test results. She continued with her shifts as normal.

Four days later on Dec. 21, after working closely with patients throughout a nine-hour shift, Gerow tested positive for the coronavirus. She was sent for a second test at a drive-thru testing clinic. She sat in her car and cried.

Gerow's family is immunocompromised. Her mother is a cancer survivor, her father has a pacemaker, and her 89-year-old grandfather was also living with them at the time. Not to mention the patients that she had been interacting with were vulnerable.

She said she thought she had been exposed by a patient who had recently tested positive.

Her mother brought her food, her aunt brought Christmas decorations, and she FaceTimed with her fiancé on Christmas Eve. It was the saddest Christmas of her life. She remembers thinking, "This is how my COVID patients felt." Isolated. Alone.

SPRING 2021

This spring, Placella is working through her clinical hours at a hospital near her college in Connecticut. It has been tough. The risk of contracting the coronavirus at a hospital, or unknowingly bringing it in, is always on Placella's mind.

"[Having nursing students work shifts during a pandemic] is uncharted territory for students, instructors and hospital staff alike," she said.

All three women have already faced death head on. Gerow nearly lost her father when she was a senior in high school, so she understands the loss of control and fear that her patients and their families experience. She remembers her father explaining to her when she was a child that death is a part of life.

"[Death] can be a release of peace for those who are suffering and who are ready to go," Gerow said.

She feels honored to care for people in their final moments, or even after they die.

Gerow, Ismail and Placella are now fully vaccinated. They're relieved, for themselves and for their families and patients who they can now keep that much safer.

All three went into nursing to help people and to be around people. "I've always been a fixer," Gerow smiled.

Placella said she feels emboldened in her pursuit of nursing. Witnessing the resilience of nurses this year as the demands they face skyrocket inspires her. She feels better prepared.

This year, Ismail realized she can handle a lot more than she thought she could. They all have. ●

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DEPRESSION, ANXIETY INCREASE RISK FOR OPIOID USE, DEATH AMONG BREAST CANCER SURVIVORS

By Rajesh Balkrishnan

Mental health comorbidities such as depression and anxiety increased risks for opioid use and mortality among older breast cancer survivors, according to study results published in *Journal of Oncology Practice*.

"Studies have found that many breast cancer survivors stop taking their first-line adjuvant hormone treatments," Rajesh Balkrishnan, PhD, co-program director of population health and prevention sciences and director of the Cancer Control Core at University of Virginia Cancer Center, said in an interview with *HemOnc Today*. "We were trying to understand the reasons this was happening. One of the things that came up was that many of these medications are associated with musculoskeletal side effects. So, there needs to be a concurrent pain management treatment for many of the women who are on these medications."

Balkrishnan said although nonhabit-forming medications such as Advil or Motrin achieve adequate

pain relief for some women, others continue to experience debilitating pain.

“Many of these women need to be put on short courses of opioids just to manage the pain, and then a plan has to be put in place to bring the women off the opioids,” he said.

However, Balkrishnan and his colleagues noticed that many of these women were continuing to refill opioid prescriptions for extended periods of time. The researchers decided to further assess the potential factors contributing to this behavior.

“We started looking at this in more detail, and we started identifying the characteristics of these women a bit better,” he said.

‘A COMPLICATED PHENOMENON’

In the retrospective cohort study, Balkrishnan and colleagues assessed SEER-Medicare data sets spanning 2006 to 2012 and followed 10,452 breast cancer survivors for a minimum of 2 years from the first date they filled a prescription for adjuvant endocrine therapy. The study population consisted of adult women with primary, hormone receptor-positive stage I to stage III breast cancer. The researchers evaluated opioid use after commencement of adjuvant endocrine therapy among survivors with diagnosed mental health comorbidities, the most common of which included depression (n = 554) and anxiety (n = 246). They also assessed survival at the end of the study interval.

Survivors with mental health comorbidities (n = 739) appeared more likely than those without mental health comorbidities (n = 9,713) to have been diagnosed with breast cancer at age 64 years or younger (30.7% vs. 8.7%) and to be white (88% vs. 84.2%) and single (69.6% vs. 56.5%). A majority of patients with mental health comorbidities were eligible for both Medicare and Medicaid (52.2%), had a pre-diagnosis Charlson comorbidity index of 0 (51.1%), experienced pain-related conditions (70%) and had stage I cancer (58.3%).

To balance comparison groups and minimize potential bias due to confounding, researchers created a propensity score-matched sample (n = 1,474). Among that sample, conditional logistic regression revealed women with mental health comorbidities were 33% more likely to use opioids than those with no such comorbidities (OR = 1.33; 95% CI, 1.06-1.68). Moreover,

Cox proportional hazards regression showed those with mental health comorbidities had a significantly increased risk for death (HR = 1.49; 95% CI, 1.02-2.18).

“A lot of these women seem to be having mental health conditions like anxiety and depression, which I think is fueling this type of behavior,” Balkrishnan said. “This is a fairly complicated phenomenon where there are many things going on at the same time.”

Many of the women who continued to refill opioid prescriptions also lived in rural areas with limited access to high-quality cancer care, Balkrishnan added.

‘NOT A DEATH SENTENCE’

As many as 40% of patients with breast cancer have a mental health comorbidity, and previous studies have shown a strong association between mental health and use of opioids, according to researchers.

The researchers acknowledged several limitations to their study, including a lack of knowledge about the indications for the opioids used, the level of pain evaluations and opioid strength or dosage.

According to Balkrishnan, these findings suggest a need for clinicians to discuss issues of pain management with breast cancer patients, and to address depression or anxiety that may arise from a cancer diagnosis.

Balkrishnan said many of the women who continued to fill opioid prescriptions lived in rural areas with limited access to high-quality cancer care.

“Clinicians treating these patients need to realize that there needs to be a plan in place, and it needs to be emphasized that this is not a death sentence, that with treatment, many women go on to live into their eighties,” he told HemOnc Today. “We don’t want these women to beat cancer only to die of an opioid overdose. What needs to be said is that this is going to be difficult, but they shouldn’t worry; we’re going to fight it together.” – by Jennifer Byrne. ●

NURSING SCHOOLS SEE APPLICATIONS RISE, DESPITE COVID BURNOUT

By Pat Eaton-Robb

Nurses around the U.S. are getting burned out by the COVID-19 crisis and quitting, yet applications to nursing schools are rising, driven by what educators say are young people who see the global emergency as an opportunity and a challenge.

Among them is University of Connecticut sophomore Brianna Monte, a 19-year-old from Mahopac, New York, who had been considering majoring in education but decided on nursing after watching nurses care for her 84-year-grandmother, who was diagnosed last year with COVID-19 and also had cancer.

“They were switching out their protective gear in between every patient, running like crazy trying to make sure all of their patients were attended to,” she said. “I had that moment of clarity that made me want to jump right in to health care and join the workers on the front line.”

Nationally, enrollment in bachelor’s, master’s and doctoral nursing programs increased 5.6% in 2020 from the year before to just over 250,000 students, according to the American Association of Colleges of Nursing.

Figures for the current 2021-22 school year won’t be available until January, but administrators say they have continued to see a spike in interest.

The University of Michigan nursing school reported getting about 1,800 applications for 150 freshman slots this fall, compared with about 1,200 in 2019.

Marie Nolan, executive vice dean of the Johns Hopkins University School of Nursing in Baltimore, said it has seen its biggest number of applicants ever, many of them applying even before a vaccine was available, despite her worries that COVID-19 would scare off students.

Students at those and other schools have been able to gain valuable hands-on experience during the

pandemic, doing COVID-19 testing and contact tracing and working at community vaccination clinics.

“We’ve said to the students, ‘This is a career opportunity that you’ll never see again,’” Nolan said.

Emma Champlin, a first-year nursing student at Fresno State, said that like many of her classmates, she saw the pandemic as a chance to learn critical-care skills and then apply them. And she is young and her immune system is fine, she said, “so the idea of getting the virus didn’t scare me.”

“It’s just time for us to step in and give it our all and figure out how we can help, because there has to be a new generation and that’s got to be us,” the 21-year-old said.

The higher enrollment could help ease a nursing shortage that existed even before COVID-19. But it has brought its own problems: The increase, combined with the departure of too many experienced nurses whose job is to help train students, has left many nursing programs without the ability to expand.

The rise is happening even as hospital leaders around the U.S. report that thousands of nurses have quit or retired during the outbreak, many of them exhausted and demoralized because of the pressure of caring for the dying, hostility from patients and families, and the frustration in knowing that many deaths were preventable by way of masks and vaccinations.

Eric Kumor saw many of his nursing colleagues from a COVID-19 unit in Lansing, Michigan, transfer or take other jobs this past spring when the pandemic’s third wave began to hit. He followed them out the door in July.

“It was like this mass exodus. Everybody chose their own health and wellness over dealing with another wave,” he said.

He said he plans on returning to health care someday, but for now is working at a barbecue joint, where the worst thing that can happen is “burning a brisket.”

“I’m not done with nursing yet,” he said.

Betty Jo Rocchio, chief nursing officer for Mercy Health, which runs hospitals and clinics in Missouri, Arkansas, Kansas and Oklahoma, said her system has about 8,500 nurses but is losing about 160 each month.

The departures are also taking their toll on nursing education, which relies on clinical instructors and preceptors, the experienced, hands-on nurses who mentor students on the job.

Nursing faculty is expected to shrink by 25% by 2025 across the country as nurses retire or leave because of burnout or other reasons, said Patricia Hurn, the nursing school dean at Michigan.

Mindy Schiebler, a cardiac nurse from Vancouver, Washington, taught nursing students for three years before quitting in 2016. She said she would love to still be teaching but that it's not workable financially. She said she knows nursing professors who work multiple jobs or dip into their retirement savings.

"How long can you subsidize your own job?" she asked. "Nurses will make double what you make in just a few years out of the gate."

Administrators said they would like to see more financial incentives such as tax breaks for instructors and preceptors. Rocchio said it would also help to have national licensing instead of state-by-state requirements, giving health systems more flexibility in training and hiring.

Champlin, the Fresno State student now doing clinical studies in a COVID-19 ward, said the stress, even on students, is sometimes overwhelming. It's physically and mentally tiring to don cumbersome protective equipment every time you enter someone's room and then watch as a tube is inserted down the frightened patient's throat and the person is hooked up to a ventilator.

"I don't even know when it will stop," she said. "Is this the new normal? I think the scariness of it has worn off at this point, and now we're just all exhausted." She confessed: "That has had me reconsider, at times, my career choice."

Hurn said the pandemic has led to a new focus at her school on the mental health of students, leading to the creation of programs such as "Yoga on the Lawn."

"For nursing, you have to develop the skills to be resilient, to adapt to high-strain conditions," she said.

Monte, whose grandmother survived, said she believes the pandemic is waning and hopes to have a long career no matter the challenges.

"They do have this nursing shortage right now, which selfishly is good for me, because I won't have trouble finding a job, wherever I decide to go," she said. "I feel like I won't get burned out, even if we have another national emergency. I feel I'll still be committed to nursing." ●

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HOW SOCIAL MEDIA TURNS ONLINE ARGUMENTS BETWEEN TEENS INTO REAL-WORLD VIOLENCE

By Caitlin Elsaesser

The deadly insurrection at the U.S. Capitol in January exposed the power of social media to influence real-world behavior and incite violence. But many adolescents, who spend more time on social media than all other age groups, have known this for years.

"On social media, when you argue, something so small can turn into something so big so fast," said Justin, a 17-year-old living in Hartford, Connecticut, during one of my research focus groups. (The participants' names have been changed in this article to protect their identities.)

For the last three years, I have studied how and why social media triggers and accelerates offline violence. In my research, conducted in partnership with Hartford-based peace initiative COMPASS Youth Collaborative, we interviewed dozens of young people aged 12-19 in 2018. Their responses made clear that social media is not a neutral communication platform.

In other words, social media isn't just mirroring conflicts happening in schools and on streets – it's intensifying and triggering new conflicts. And for young people who live in disenfranchised urban neighborhoods, where firearms can be readily available, this dynamic can be deadly.

INTERNET BANGING

It can result in a phenomenon that researchers at Columbia University have coined “internet bashing.” Distinct from cyberbullying, internet bashing involves taunts, disses and arguments on social media between people in rival crews, cliques or gangs. These exchanges can include comments, images and videos that lead to physical fights, shootings and, in the worst cases, death.

It is estimated that the typical U.S. teen uses screen media more than seven hours daily, with the average teenager daily using three different forms of social media. Films such as “The Social Dilemma” underscore that social media companies create addictive platforms by design, using features such as unlimited scrolling and push notifications to keep users endlessly engaged.

According to the young people we interviewed, four social media features in particular escalate conflicts: comments, livestreaming, picture/video sharing and tagging.

COMMENTS AND LIVESTREAMS

The feature most frequently implicated in social media conflicts, according to our research with adolescents, was comments. Roughly 80% of the incidents they described involved comments, which allow social media users to respond publicly to content posted by others.

Taylor, 17, described how comments allow people outside her friend group to “hype up” online conflicts: “On Facebook if I have an argument, it would be mostly the outsiders that’ll be hypin’ us up ... ‘Cause the argument could have been done, but you got outsiders being like, ‘Oh, she gonna beat you up.’”

Meanwhile, livestreaming can quickly attract a large audience to watch conflict unfold in real time. Nearly a quarter of focus group participants implicated Facebook Live, for example, as a feature that escalates conflict.

Brianna, 17, shared an example in which her cousin told another girl to come to her house to fight on Facebook Live. “But mind you, if you got like 5,000 friends on Facebook, half of them watching ... And most of them live probably in the area you live in. You got some people that’ll be like, ‘Oh, don’t fight.’ But in the majority, everybody would be like, ‘Oh, yeah, fight.’”

She went on to describe how three Facebook “friends” who were watching the livestream pulled up in cars in front of the house with cameras, ready to record and then post any fight.

STRATEGIES TO STOP VIOLENCE

Adolescents tend to define themselves through peer groups and are highly attuned to slights to their reputation. This makes it difficult to resolve social media conflicts peacefully. But the young people we spoke with are highly aware of how social media shapes the nature and intensity of conflicts.

A key finding of our work is that young people often try to avoid violence resulting from social media. Those in our study discussed four approaches to do so: avoidance, deescalation, reaching out for help and bystander intervention.

Avoidance involves exercising self-control to avoid conflict in the first place. As 17-year-old Diamond explained, “If I’m scrolling and I see something and I feel like I got to comment, I’ll go [to] comment and I’ll be like, ‘Hold up, wait, no.’ And I just start deleting it and tell myself ... ‘No, mind my business.’”

Reaching out for support involves turning to peers, family or teachers for help. “When I see conflict, I screenshot it and send it to my friends in our group chat and laugh about it,” said Brianna, 16. But there’s a risk in this strategy, Brianna noted: “You could screenshot something on Snapchat, and it’ll tell the person that you screenshot it and they’ll be like, ‘Why are you screenshotting my stuff?’”

The deescalation strategy involves attempts by those involved to slow down a social media conflict as it happens. However, participants could not recount an example of this strategy working, given the intense pressure they experience from social media comments to protect one’s reputation.

They emphasized the bystander intervention strategy was most effective offline, away from the presence of an online audience. A friend might start a conversation offline with an involved friend to help strategize how to avoid future violence. Intervening online is often risky, according to participants, because the intervener can become a new target, ultimately making the conflict even bigger.

PEER PRESSURE GOES VIRAL

Young people are all too aware that the number of comments a post garners, or how many people are watching a livestream, can make it extremely difficult to pull out of a conflict once it starts.

Jasmine, a 15-year-old, shared, “On Facebook, there be so many comments, so many shares and I feel like the other person would feel like they would be a punk if they didn’t step, so they step even though they probably, deep down, really don’t want to step.”

There is a growing consensus across both major U.S. political parties that the large technology companies behind social media apps need to be more tightly regulated. Much of the concern has focused on the dangers of unregulated free speech.

But from the vantage point of the adolescents we spoke with in Hartford, conflict that occurs on social media is also a public health threat. They described multiple experiences of going online without the intention to fight, and getting pulled into an online conflict that ended up in gun violence. Many young people are improvising strategies to avoid social media conflict. I believe parents, teachers, policymakers and social media engineers ought to listen closely to what they are saying. ●

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UCONN 2020 GRADUATES HAVE THEIR DAY WITH COMMENCEMENT AT RENTSCHLER FIELD SATURDAY

By Rebecca Lurye

Standing outside the stadium at Rentchler Field on Saturday, Eloise Felton basked in the sight of her of grandson, a graduate in blue wearing stoles representing his academic excellence, studies abroad and his African American heritage.

It was the moment Diante Felton, a first-generation college student from Chicago, had been waiting for since last spring, when UConn — like most colleges — canceled its in-person commencement amid the COVID-19 pandemic. On Saturday, UConn started five days of in-person graduation ceremonies with a long-awaited one for its 2020 graduates, bringing relief and pride to thousands of families like the Feltons.

“It means a lot to me because I get to complete the four-years journey, and this occasion that not many get to see,” said Diante Felton, a business and management major who hopes to work on diversity and inclusion in human resources and recruitment. “I’m grateful and blessed I was able to have this opportunity.”

Graduates loosely filled the stands inside the stadium and waved to friends and family from the field, the letters “UCONN” mowed into the grass. For some, commencement was a time for reunions after more than a year apart.

In the concourse, a political science major let out a quiet, “Jonathan!” as he beelined for UConn’s canine mascot. Sean Oppenheimer, 21, of Fairfield used to see the husky on morning walks to the bus, but those ended early in the pandemic.

Only a fraction of UConn’s 2020 graduates came out to East Hartford on Saturday, leaving plenty of room for a socially distanced ceremony. UConn awarded 8,912 degrees last May, including 6,335 bachelor’s degrees and 1,877 master’s.

The class also included the university’s first Rhodes Scholar, environmental sciences major Wanjiku Gatheru, and the most Goldwater Scholars in UConn’s history.

Students mostly watched last year’s virtual commencement from their living rooms at home, a lackluster end to a bizarre, abbreviated senior year.

Twins Braden and Austin Frandino, both music majors, made the most of the day, popping a bottle of champagne with their parents, who’d hung graduation decorations from the fireplace in their New York home.

Kiana Foster-Mauro’s mother, grandmother and great-grandmother watched with the 22-year-old elementary education major as she became the first in her family to graduate college.

Nadeige Bailey, another first-generation graduate, said she cried on her couch last May as she watched her name flash across her computer screen “for like two seconds.” That was the culmination of her two-year, sports management graduate program.

“You missed out on the experience,” Bailey said Saturday as she prepared to head into Rentschler Field. “We worked so hard on our master’s, so to not be able to close out the chapter was bittersweet.”

Saturday’s commencement changed all that. She smiled against the morning rain wearing a cap decorated with flowers — yellow to match her tassel — and one of her favorite scriptures, “She laughs without fear of the future.”

“It’s also applicable with COVID because you don’t know what’s going to happen,” Bailey said.

Personalized mortarboards dotted the stadium: “Magic School Bus” and planet Earth designs worn by future teachers, the words “Law school? Beyond a reasonable doubt!” written on the cap of a future attorney.

The latter was worn by Andrew Dubsky, 23, of Natick, Massachusetts, who is already through his first year of Boston College Law School.

“We all kind of moved on, but we get to celebrate that we finished together,” he said. Katie Amara, 23, of Chester had a similar view on her bachelor’s in animal science, which she’s now following up with a four-year program at Tufts University.

“I have a whole new life now at Tufts, but I feel like I just wanted closure on this,” she said.

Amara’s dad, Ron, was overjoyed. He wore the UConn sweater Katie got for his birthday and met her outside the stadium with a hug and a teal-colored cord. “I saved it in her old room for just this occasion, in case we had a graduation,” he said. “I did a lot of praying and a lot of hoping.”

Ron Amara also called the university a couple of times, urging that a commencement be held. On Saturday, he took in the sight of hundreds of graduates in their robes, knowing all of them are, like Katie, a year into their new lives post-COVID-19 and post-degree.

“To see all the kids here all dressed up, for them to come back, it shows it means a lot for them,” he said.

Foster-Mauro, of Groton, had more regalia than most Saturday, multiple stoles, a half-dozen cords and the silver honor’s medal she earned for her thesis on multiracial representation in children’s picture books.

She and Damayanti Rane-Castrodad, 22, of Mystic will also be back Wednesday — they both completed master’s programs during the pandemic after earning their bachelor’s degrees in elementary education in 2020.

But Saturday was about that first milestone, and the walk across the stage for their families.

“To be able to celebrate with everybody together is really exciting,” said Rane-Castrodad. Back in May, she took her family on a nostalgic tour of the Storrs campus. But there’s one more bit of closure she’d like to get, pizza from McMahan Dining Hall or maybe chicken tenders from South, once things are all back to normal.

Fortunately, she has a little brother at UConn she can visit.

“Listen,” Rane-Castrodad said, “nobody likes the dining hall food, but one last swipe into the dining hall to enjoy my favorite food.” ●

University News

CT OFFICIALS AIM TO KEEP COLLEGE GRADS IN STATE: 'WE'VE ALWAYS HAD THE BEST TALENT IN THE WORLD'

By Paul Schott

In June, Connecticut notched one of its biggest-ever months for corporate recruitment as four major companies committed to opening offices and bringing hundreds of jobs to the state.

Those announcements were widely cheered by business leaders and elected officials. But those arrivals have also generated debate about whether Connecticut has positioned itself to reverse years of lackluster jobs growth and bolster its ability to keep young professionals.

Republican legislators continue to express major concerns about Connecticut's economic performance, but Gov. Ned Lamont and other Democrats are bullish and point to programs that they said are encouraging recent college graduates to stay in the state.

"I am both confident and eager to continue building my career in Connecticut," said Evan Duval, who graduated from the University of Connecticut last year and was one of the fellows in the inaugural class of the Governor's Innovation Fellowship, a career-development program. "The state has so much to offer and has made strides to ignite and support innovation."

DEVELOPING HOMEGROWN TALENT

The recent corporate announcements underscored southwestern Connecticut's standing as a major corporate destination, trend watchers have said.

Tobacco giant Philip Morris International is relocating its headquarters to the state from Manhattan, with company officials indicating that they are exploring locations in Fairfield County. Financial-technology firm iCapital Network is opening offices in Greenwich; manufacturer and technology-services provider ITT

is moving its headquarters from White Plains, N.Y., to Stamford; and Tomo Networks, a new financial-technology firm focused on real estate, has established its headquarters in Stamford.

Those companies have cumulatively committed to creating a total of more than 550 jobs in Connecticut.

Statewide, however, Connecticut is still grappling with the disruption unleashed by the coronavirus pandemic. Connecticut's unemployment rate dropped from 8.1 percent to 7.7 percent in May, but still ran above a 5.8 percent national level.

Long before the pandemic emerged, Connecticut had struggled to create jobs. In January 2020, it had recovered only 83 percent of the positions lost in its 2008-2010 recession.

"Young people in Connecticut are graduating to an unemployment pool of over 100,000 people. Connecticut is dead last in the nation in job growth and income growth," said state Sen. Kevin Kelly, R-Stratford, the Senate's Republican minority leader. "Generational poverty is a pervasive problem in our state, especially in our cities. Income growth is not keeping up with the cost of living. These are unpleasant truths, but we have to be honest about our state's weaknesses so that we can improve."

Officials in Lamont's administration do not deny the state's longstanding economic struggles. But they said that they have worked since he took office in January 2019 to reinvigorate the jobs market and make the state more attractive to young professionals. They said that the arrivals of Philip Morris International, iCapital Network, ITT and Tomo showed that the strategy was working.

The Lamont administration also cites career-development programs such as the Innovation Fellowship, whose launch was announced in February 2020. GIF is managed by CTNext, an entrepreneurship-focused subsidiary of Connecticut Innovations, the state-chartered venture capital organization, and based on a similar initiative that was launched in 2002 in Indianapolis.

The inaugural GIF class included 18 fellows who were recent college graduates. Most of them were alumni of Connecticut universities. They each received a \$5,000 grant to help cover housing and other living expenses

and also received mentorships and other support services.

“We’ve always had the best talent in the world here in Connecticut,” Lamont said at a June 30 business-networking event in Stamford. “We’ve got to work to keep that going.”

Nearly all of the companies that took part in the pilot phase were companies with headquarters or major offices in Stamford. The 15 participating companies were Curacity, Ellington Management Group, EY, Fletcher Knight, Encaptiv, Freepoint Commodities, Henkel, IronYun, ISG, McKinsey and Co., Noble Savages, Synchrony, Sema4, Trebel Music and Tru Optik.

“We view the program as a great way to identify and bring in talent from Connecticut universities,” said Eric Schadt, founder and CEO of Stamford-based Sema4, which focuses on health care information.

Despite the pandemic’s disruption — and ensuing lack of in-person programming — fellows such as Matthew Sabourin said the program still turned out to be worthwhile. He did his fellowship at Sema4 after graduating last year from Sacred Heart University where he majored in computer science. He works today as a development operations coordinator at Sema4 while also pursuing a master’s degree in cybersecurity at Sacred Heart.

“Throughout the past year, all the fellows would meet virtually a couple of times a month for different types of events,” Sabourin said. “These events were very cool and ranged from making homemade pasta to hearing top entrepreneurs of Connecticut speak and getting to ask them questions about how they became successful. I think that all the fellows were able to gain valuable knowledge from these events, and we were able to become closer,” he said.

Seventeen of the 18 GIF fellows are still employed by the companies where they did their fellowships.

“With the incredible support of GIF, CTNext and my team at Fletcher Knight, I am grateful for the strong foundation and my growing network of Connecticut-based professionals I have met through GIF,” said Duval, the UConn graduate, who majored in psychological science. Fletcher Knight, a marketing-consulting firm based in Stamford, is where she spent her fellowship. She works today at the company as a junior consultant.

Kelly said that the recent corporate announcements and programs such as GIF would have a limited impact and not significantly reduce Connecticut’s jobless numbers or tackle other structural issues.

“A few hundred jobs in the Greenwich-Stamford area and a handful of scholarships for those who have excelled in school is positive, but it’s not transformative nor will it employ 100,000 people,” Kelly said. “It is not a career-growth initiative. It does nothing for the kids struggling to raise themselves up and out of poverty in Hartford. It does nothing for the teen in eastern Connecticut who doesn’t want to pursue college and wants to enter the workforce right out of high school.”

Officials at CTNext said that the program deliberately had a limited scope in its pilot phase to ensure that its premise would work. Now, having seen the program gain traction in Stamford, they said they anticipate expanding GIF to other parts of the state.

As a result of the pandemic’s disruption, the next class of GIF fellows is scheduled to start in the summer of 2022, rather than this summer.

“We see this being a program available for the foreseeable future,” said Jessica Dodge, CTNext’s director of programs and operations. “I think this will be something we look to as a cornerstone in talent retention here in Connecticut, which is vital to us in serving small businesses and entrepreneurs.”

REASONS FOR STAYING IN CONNECTICUT

Connecticut universities said they are seeing large numbers of graduates stay in the state, a trend that will need to be maintained for the state to complete its recovery from the pandemic-sparked economic downturn.

Some 73 percent of the University of Connecticut’s graduating class of 2020 who attended high school in the state and were employed said they were still in Connecticut, according to university data collected up to six months after graduation.

For those in the 2020 class who did not attend high school in Connecticut and were employed, 22 percent said that they were working in the state.

For Sacred Heart's class of 2019, 53 percent of its placements for full-time opportunities — including employment and graduate school — were in Connecticut.

"Although we do have a large number of alumni outside of Connecticut, we are finding more and more students are interested in staying local after commencement to continue the professional relationships they have developed throughout their four years at SHU," said Keith Hassell, Sacred Heart's executive director of career and professional development.

Cities with vibrant corporate sectors and thriving entrepreneurial scenes such as Stamford, New Haven and Norwalk have generally fared better than other parts of the state in attracting young professionals, data show.

"I strongly believe programs like the Governor's Innovation Fellowship will contribute to the retention of talent within the state and will show that a place like Stamford is a cool place to live and work," said Christopher Connolly, who did his fellowship at professional-services firm EY after graduating last year from Fairfield University where he majored in finance.

Today, he is a Stamford-based member of EY's business consulting practice staff.

"I believe that the opportunities to grow and develop your career in Connecticut are high," Connolly said. "Stamford is such a young and vibrant city that has so much to offer and has some of the best companies to work for." ●

2021 POWER 25 REAL ESTATE: LAURA CRUICKSHANK

UConn may be one of the most active developers in the state of Connecticut.

By Rebecca Lurye

Step on to the Storrs campus and you'll find a small city in the middle of a rural community. And don't forget UConn's other campuses in Avery Point, Waterbury, Stamford and Hartford, which debuted just a few short years ago after a \$150-million plus buildout.

Overseeing all of it is Laura Cruickshank, UConn's master planner, chief architect and associate vice president of university planning, design and construction. It's a long title for someone with big responsibilities.

UConn has been very active over the past year including with the construction of its new Northwest Science Quad, which is a total of five projects on the Storrs campus that will encompass 22 acres and cost \$640 million when fully complete.

"All of the projects are interconnected and have to be coordinated for completion, it is like dominoes," Cruickshank said.

The school also completed a new Athletics District Development, including the Rizza Family Performance Center, Elliot Ballpark (now home to the men's baseball team), Morrone Stadium for soccer and women's lacrosse and Burrill Family Field for softball.

UConn also just broke ground on a new \$70 million on-campus hockey arena.

Cruickshank is also working on a student housing master plan and the renovation of the Gant Building, a 285,000-square-foot, three-phase project that encompasses state-of-the-art teaching and research labs for multiple science disciplines, faculty offices and classrooms. The entire building (walls, roof, windows) and infrastructure were rebuilt and are targeting LEED Gold certification.

Finally, a new 200,000-square-foot STEM science building is under construction, scheduled to be completed in fall 2022.

Cruickshank, who was previously the university planner at Yale, said one of her most significant accomplishments was overseeing the restoration of the Hartford Times building, which is now home to the school's Hartford campus. ●

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GROWING UCONN HUMAN RIGHTS CENTER HONORS CHRIS DODD, EMPHASIZES FOCUS WITH NAME CHANGE

By Cayla Bamberger

UConn's Dodd Research Center will formally change its name to reflect new programs and honor Connecticut's longest-serving senator.

The University of Connecticut's Board of Trustees voted on Wednesday to rename The Thomas J. Dodd Research Center to The Dodd Center for Human Rights. Former Sen. Chris Dodd (D-Conn.), who served 30 years in that role, was there to receive the honor.

UConn officials said the name change highlights the center's growing human rights academic, research and outreach programs, alongside the archival-research component of the center's former moniker.

The rededication effort also expands the center's honorees to include both father and son: former senators Thomas and Christopher Dodd.

"This is more than a building, it's more than a name on the building," said Chris Dodd. "That we're committed to this subject matter — that means more than anything."

The institute has one of the largest human rights majors in the country, center officials said, and is launching a

master's in human rights program this fall. Dodd Center programs touch on business and human rights, democracy and dialogue, human rights and civic education, and human rights, film and digital media.

"Senator Christopher Dodd was the key person that made this important place on this campus in his father's name possible," said Kathryn Libal, the director of the center's Human Rights Institute.

Dodd was involved in establishing the archival and research center on the Storrs campus, according to attachments to the board meeting agenda. The building was dedicated in 1995 to honor his father, Thomas Dodd, a Nuremberg prosecutor and also a senator.

Chris Dodd previously represented Connecticut's 2nd District in Congress and is the name behind the Dodd-Frank Act, a law that regulated the financial services industry after the Great Recession. UConn officials also said his leadership was "critical" to the Affordable Care Act.

"There is no one who is more important and sustained than Senator Christopher J. Dodd," said Glenn Mitoma, the director of Dodd Human Rights Impact.

Mitoma added he had the honor of working with Dodd "over the past 8 years as we crafted these new programs, as we envisioned the kind of impact that we wanted to have, and as we worked to develop the resources in order to support these initiatives."

Gov. Ned Lamont was not at the board meeting, but sent Paul Mounds, his chief of staff, on his behalf.

"The renaming of this center that's truly encompassing of two of the greatest senators in our state's history is not only about the individuals," said Mounds. "It's also about mission — the mission of human rights."

"The center has grown to be a leading academic center for that very mission," he said. The motion to rename the center passed unanimously.

The Dodd Center, including Dodd Impact, will be overseen by an external advisory board, UConn officials said. Dodd has also created, with his wife Jackie Clegg, the Dodd Endowment to support the human rights work.

The building will continue to house the Center for Judaic Studies and Contemporary Jewish Life and the University Libraries' Archives and Special Collection.

“This is an opportunity for us at this university — at our flagship university, at the public university — to make sure that this is part of our education,” said Dodd. ●

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DESPITE PANDEMIC, UCONN FOUNDATION HAS RECORD-BREAKING FUNDRAISING YEAR

By Michelle France

Despite the challenges of the COVID-19 pandemic, the UConn Foundation said it had a record-breaking year in fiscal 2021 after raising \$28.5 million.

That’s \$5.4 million more than what was raised in the 2020 fiscal year.

This is the second consecutive year the foundation broke a record for its fundraising total, according to UConn.

From the 2020 to the 2021 fiscal year, fundraising increased from \$89.5 million to \$93.3 million, the school said. The fiscal year runs from July 1 to the end of June each year. UConn said the number of donors also increased by 24%.

Money raised will support scholarships and fellowships for undergraduate, graduate, and professional students at UConn. Since 2015, the foundation has raised \$174.4 million from nearly 23,000 alumni and other donors.

Funding for UConn Health reached \$17.2 million last fiscal year to support research, advanced patient care, and related academic programs, the school said.

Funding for the Division of Athletics reached \$21.4 million last fiscal year to support the men’s and women’s ice hockey programs. ●

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PUSHING TO COMPETE NATIONALLY, UCONN SECURES RECORD-HIGH RESEARCH FUNDING

By Seamus Mcavoy

A pandemic didn’t stop UConn from recording its largest ever year of external research funding.

UConn researchers won a total of \$375.6 million in new awards in the 2020-21 fiscal year, which ended June 30, well exceeding last year’s then-record of \$285.8 million, the university announced Wednesday. Raising research funding levels to nationally competitive levels has been a top goal of university officials in recent years.

“UConn puts a great deal of attention and work into the support and cultivation of its research, and we have many reasons to be optimistic based on our trajectory in recent years that this growth is a trend that will continue,” Radenka Maric, UConn’s Vice President for Research, Innovation, and Entrepreneurship, said in a statement.

UConn ranked 84th nationally in research and development expenditures in the 2019 fiscal year with about \$285 million, according to data from the National Center for Science and Engineering Statistics.

That’s good for the highest ranking among other public universities in New England, but lags behind the likes of Boston University (\$534 million) and some other large state schools, including the University of Georgia (\$477 million) and Rutgers University — New Brunswick (\$657 million).

UConn’s record tally includes a \$40 million research grant, the largest of its kind in UConn’s history, awarded in June by the National Science Foundation to UConn’s medical school. The grant will fund infrastructure that will serve as a central hub for molecular research at UConn in collaboration with the University of Georgia and the University of Wisconsin.

UConn averaged \$255 million in annual research funding over the previous five fiscal years.

AFTER IMPOSING VACCINE MANDATES, CONNECTICUT COLLEGES AND UNIVERSITIES SEEING FEW COVID-19 CASES

By Alex Putterman

After nearly all Connecticut colleges and universities chose to require COVID-19 vaccination for all students returning to campus this fall, most have recorded few coronavirus cases in the early weeks of the semester, numbers from the schools show.

That marks a dramatic change from last fall, when COVID-19 cases surged on college campuses, leading schools to quarantine dorms, send home students who violated social distancing rules and, in one case, threaten to halt all in-person classes.

The change is particularly notable at UConn, which last year experienced hundreds of COVID-19 cases and was forced to quarantine entire dormitories on several occasions. So far this fall, the university has reported only 18 cases among students on its Storrs campus.

Elly Daugherty, UConn's dean of students, attributed the relatively low incidence of COVID-19 cases to the school's vaccine mandate, which allows for religious and medical exemptions.

"Vaccination is the quick answer," Daugherty said. "But having a compassionate introduction to a new requirement during an unsettling time was really essential."

Older residents and workers at risk now eligible for Pfizer booster shot in revised overnight CDC ruling »

Connecticut's other public universities have had similar success in limiting COVID-19 on campus so far this fall. Central Connecticut State has reported 12 cases among residential students and staff since late August. Southern Connecticut State has reported 11 cases among residential students, Eastern Connecticut State

"The university works every day to strengthen Connecticut's position as a national and global center of innovation," Dr. Andrew Agwunobi, UConn's Interim President and CEO of UConn Health, said in a statement.

"Sponsored program awards are critical to the research underpinning those efforts, and to the equally important missions of expanding the academic enterprise and providing hands-on experience to students and early-career researchers," Agwunobi added.

University officials weren't sure what effect the COVID-19 pandemic would have on the money available to researchers and anticipated that there may be a dip, according to UConn spokesperson Stephanie Reitz.

Instead, some sources were even more generous than expected. A total of 746 proposals were selected for funding, predominantly from federal sources like the National Institutes of Health, with most of the grants going to support medical and health research.

"Everyone is very interested in health these days, probably more than ever, because of the heightened awareness that the pandemic brought," Reitz said.

Even though UConn's campus closed during the pandemic, the university's research office continued to process grant applications remotely for the more than 2,000 active researchers working across all campuses.

"We didn't miss a beat in that regard," Reitz said. "Investigators and the researchers were still able to get the support to put in their applications." ●

has reported seven, and Western Connecticut State has reported only one.

The same has been true of the state's private universities. According to the Connecticut Conference of Independent Colleges, the organization's 13 schools have recorded 430 positive results among students out of 93,016 since Aug. 23, for a positivity rate of 0.51%.

Things haven't been universally smooth — Connecticut College briefly switched to remote classes in early September amid a bump in cases, while Sacred Heart has experienced a spike in recent weeks as well — but at most local colleges COVID-19 transmission has been mild and manageable.

Officials say high levels of vaccination have not only limited cases but also allowed schools to lighten up on pandemic-related restrictions they imposed last year. The U.S. Centers for Disease Control and Prevention currently offers separate sets of guidance for campuses where nearly everyone is vaccinated and for those with lower rates of vaccination, with vaccinated campuses given more leeway.

"Last year if a person was identified as a close contact of someone who had COVID, they would be placed in isolation for 10 days," said Dr. Tom McLarney, medical director at Wesleyan, where 99% of students are vaccinated. "Now, with the CDC's guidelines if somebody is fully vaccinated, asymptomatic and identified as a close contact, they can continue to go to class; they can continue to go to dining; they can continue life as normal."

Though nearly all Connecticut colleges and universities have required vaccination for students, control measures have differed from campus to campus in other ways. For example, whereas most schools have limited testing to unvaccinated students and those with symptoms, Wesleyan continues to require twice-weekly testing for all students.

"We feel as a course of safety that we would start the semester with twice-a-week testing," McLarney said. "We're going to be monitoring the cases that we have, and if at any point we really have a flattening of the curve, there's a possibility that we can scale back."

UConn doesn't test vaccinated students regularly but does monitor potential outbreaks through wastewater

analysis, which provides some warning ahead of budding outbreaks.

"The comfort in [not testing widely] comes from our reliance on the wastewater system," she said. "I'm able to monitor that and see if I see any aberrant presence of COVID that's not consistent with our testing, and if there were, then I would then do more extensive PCR-based testing to figure out where that is."

It helps, college officials say, that they've been managing COVID-19 for more than a year now. After spending much of last year figuring out best-practices on the fly, officials say they now feel more comfortable dealing with cases when they crop up.

"Last year when you found out you had a positive student it was almost like a panic," said Jessica Nicklin, associate vice president for student success at the University of Hartford. "Now if you get a positive student, there's a little more comfort in knowing, 'OK, this is what we have to do.'" ●

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COLLEGES INNOVATE TO SUPPORT AT-RISK STUDENTS, INSIDE AND OUTSIDE THE CLASSROOM

Customer relationship management systems, chatbots and data analytics help colleges provide timely, personalized assistance.

By Wylie Wong

Student retention has been a priority for universities for years, but declining enrollments during the pandemic have led many institutions to amplify their efforts. More than ever, colleges are leveraging technology, support services and campus resources — including tutoring, advising, financial aid and mentorship — to help at-risk

students stay in school, thrive academically and have enriching experiences.

In fact, 72 percent increased investments in student success technologies during the pandemic, according to a recent EDUCAUSE survey.

Colleges are paying special attention to first-generation and low-income students and to those from historically marginalized communities, using data analytics to identify students at risk of dropping out.

“Data is so important because it tells you a story. It helps to find the hidden students who may fall through the gaps,” says Tadarrayl Starke, associate vice provost for student success at the University of Connecticut. “We want to use that to inform our decisions and then measure whether we are making a difference.”

Student success technologies include customer relationship management (CRM) software; chatbots that provide 24/7 access to information, alerts and notifications; and health and wellness apps, says Kathe Pelletier, director of EDUCAUSE’s teaching and learning program.

COVERING THE TECHNOLOGY BASICS FOR STUDENT SUCCESS

Access to broadband and computers is, of course, an essential factor in student success. As the pandemic forced institutions to go fully or partially online, it put a spotlight on at-risk students, especially low-income students who lacked devices, computers and internet access.

An EDUCAUSE survey from fall 2020 found that many students struggled to get reliable connectivity, including almost half of students living on campus. Nearly all students had access to computing devices, but not every student had a device with enough processing power or memory for their coursework, says Pelletier.

In response, many institutions beefed up campus Wi-Fi and offered laptop lending programs. For example, UConn’s library and student support services both offered laptops to students, Starke says. Students could access free campus Wi-Fi, but UConn also provided off-campus students with information on service providers offering free and reduced-cost broadband during the pandemic.

The university also developed online training modules to teach students how to use learning management systems and videoconferencing tools, such as Cisco Webex, Microsoft Teams and Google Meet.

“It wasn’t just laptops but how to effectively use online tools for their classes,” Starke says. “We wanted to reduce reasons, technologywise, as to why students couldn’t attend class.”

SUPPORTING STUDENT RETENTION WITH DATA-INFORMED INTERVENTIONS

Data analytics is often central to student success initiatives. Many institutions have invested in CRM software that aggregates student data from across the student lifecycle, from admissions to alumni, and lets staff monitor student performance, communicate with students and track interactions.

“CRM can enable a whole-picture view of students and is intended for multiple stakeholders to use, whether it’s the financial aid office, advisers or career counselors,” Pelletier says. “Through predictive analytics, they can intervene before a student missteps.”

Universities use a variety of technologies to achieve this functionality. UConn developed an in-house software suite, Nexus, that integrates student data, provides advising and tutoring features, and uses early intervention to identify and communicate with at-risk students.

The University of Kentucky uses an SAP HANA enterprise data warehouse that gathers student data from 40 applications and databases. Then, with Tableau’s business intelligence and data visualization tool, staff can analyze the data and identify students who may need support.

“Data is so important because it tells you a story. It helps to find the hidden students who may fall through the gaps.”

Tadarrayl Starke Associate Vice Provost for Student Success, University of Connecticut

To improve retention and graduation rates, some UK campus leaders have met weekly for the past five years to discuss real-time data on students. They focus on academic preparedness and performance, health and

wellness, whether students have built a community on campus, and financial wellness, says Kirsten Turner, UK's vice president for student success. UK has also designed interventions and programs, such as tutoring and financial aid.

Insights from the Tableau reports show broad trends, but staffers also drill down into the data to find specific students who need assistance, says Turner.

"We've gotten pretty good at isolating out different groups of students based on the data that we use, and at how to provide the right interventions for those students," she says.

The next step is for UK's strategic communications group to develop a strategy for outreach. The university has standardized on Salesforce CRM software for staff to text, email or call at-risk students. In the past, UK used separate systems for each of those communication channels, but staff now manage and track them through Salesforce.

"It empowers the people who have the closest relationships with these students," says Tyler Gayheart, UK's executive director of enterprise CRM and Salesforce.

UK also uses predictive analytics to identify freshman students who need financial assistance and, to increase their likelihood of staying enrolled, provides them with additional funding, says Todd Brann, UK's executive director of institutional research, analytics and decision support.

"That has really helped propel some of the retention improvements," Brann says.

CHATBOTS PROVIDE A SAFE SPACE FOR STUDENTS TO ASK QUESTIONS

Universities use chatbots in several ways, but one of their biggest benefits is giving students 24/7 access to information while freeing staff from answering routine questions.

Chatbots can also be a safe way to ask questions that students may be reluctant to ask in person — which may be especially valuable for first-generation students without a family safety net, says Pelletier.

"They may feel embarrassed to ask staff questions about detailed processes such as applying for financial

aid," she says. "We've seen that many students are more likely to bring their questions to the institution through a chatbot and get questions answered that way."

UK has piloted alerting software that sends students personalized messages from professors, such as encouragement to visit a learning center if they didn't perform well on a test and kudos if they did well, says Gayheart.

"Instructors liked it because it reduced their load to personalize the course for the student," he says. "Students appreciate the extra attention from the instructors, particularly in large lecture courses."

COMMUNITY AND WELL-BEING FOR FIRST-GENERATION COLLEGE STUDENTS

Many institutions are also taking a whole-person approach to student success, using health and wellness apps to support students wrestling with stress, anxiety and isolation caused by the pandemic, Pelletier says.

"Apps track workouts and provide meditation and stress management techniques," she says. "Some serve as triage tools. They are self-guided and allow students to interact with an app and get the right level of care."

To reduce isolation and create opportunities for remote students to socialize and build community, UConn added a component to its Nexus web app that lets students create study groups with their classmates for virtual or in-person meetings, Starke says.

In 2020, UConn's Division of Student Affairs also launched the U-Kindness website, which enables students to connect with peers and find virtual and in-person events.

"Finding a community to connect with is so important, especially for first-generation students," Starke says. ●

BIDEN: U.S. LEADERSHIP ON HUMAN RIGHTS DEPENDS ON OUR RECORD AT HOME

By Cleve R. Wootson Jr.

President Biden on Friday sought to reassert America's leadership in the fight for human rights around the world, but he acknowledged that depends in part on the country's performance at home and said the best course is for the United States to be honest about its flaws.

Speaking at a center dedicated to Thomas Dodd, a prosecutor at the Nuremberg trials of Nazi leaders after World War II, Biden tied the horrors unveiled there to current human rights violations around the world.

"We see human rights and democratic principles increasingly under assault, and we feel the same charge of history upon our own shoulder to act," Biden said. "We have fewer democracies today than we did 15 years ago. Fewer. Not more — fewer. It cannot be sustained."

The president was invited to the Dodd Human Rights Center at the University of Connecticut by former senator Christopher J. Dodd (D-Conn.), Thomas Dodd's son and a longtime friend of Biden's. In earlier years, Biden said, the push for global human rights was sometimes wrongly seen as separate from the struggle for civil rights in America.

"Today, we know that our efforts to defend human rights around the world are stronger because we recognize our own historic challenges as part of that same fight," Biden said. "Leading by example means taking action at home to renew and defend our own democracy."

More prosaically, Biden framed the debate over his domestic policy agenda in global terms, arguing that Washington's ability to reach consensus would affect America's ability to compete in a global economy — and to serve as a moral leader. Before visiting the Dodd Center for his human rights speech, Biden stopped at a

child-care center in Hartford to underline his plans for providing free prekindergarten care.

Biden has long stressed that his presidency, in part by demonstrating competence, would aim to restore America's place as a global leader after four years of clashes with allies under Donald Trump. But intraparty squabbles have stalled Biden's infrastructure plan, and partisan logjams have choked efforts to reform policing, reduce poverty and eradicate barriers to voting rights.

"Autocrats believe that the world is moving so rapidly that democracies cannot generate consensus quickly enough to get things done," he said, adding that he had argued that point with adversaries like Chinese President Xi Jinping and Russian President Vladimir Putin. "They don't measure us based on the size of our military," Biden said. "They measure us based on whether we can get anything done."

Throughout his human rights speech, Biden raised his voice and occasionally banged on the podium for emphasis. He spoke broadly of America's struggles with voting rights, racial justice and other problems, without getting specific.

He did not mention Trump by name, for example, but he asserted that "attacks on truth are still the harbinger of tyranny," at a time when Trump continues to falsely assert that the 2020 election was stolen from him.

Weeks before Biden makes a second trip to Europe as president, Hartford and the Dodd Center, located in a community called Storrs, became the latest places for him to tout both his infrastructure plan and his worldview. In Hartford, he toured the Capitol Child Development Center, where he argued that his infrastructure plan would help build a "care economy" that safeguards the most vulnerable members of society and eases the financial burden on caretakers.

Lawmakers are almost certain to pare back the \$3.5 trillion price tag of Biden's safety-net bill, if it survives at all. But Biden said a nation's investment in its infrastructure — both logistical and social — is fundamental to its strength in the 21st-century marketplace.

"How can we compete in the world if millions of American parents, especially moms, can't be part of the workforce, because they can't afford the cost of child care or eldercare?" Biden said, noting that countries like

Latvia and Germany invest more money per capita into child care and early education than the United States.

During the dedication ceremony for the Dodd Center, Biden said the nation could best play a fundamental role in advancing human rights around the world “by practicing what we preach” and by speaking out about atrocities.

Biden’s White House has on occasion been criticized for skirting opportunities to further equity and human rights in the United States and abroad, a fact underscored by protesters who showed up Friday urging the president to end a controversial asylum policy.

From Egypt to Turkey to Saudi Arabia, the administration has struggled to balance Biden’s emphasis on human rights with a reluctance to unduly alienate allies, sometimes facing criticism from those who feel that balance was off-kilter.

At home, Biden’s administration has taken fire from his own party for not doing more to counter the raft of state laws restricting voting that have been passed in the wake of Trump’s baseless claims about a stolen 2020 election. The statutes, passed by GOP-led legislatures, have had an outsize effect on Black Americans, Democrats contend, and Biden himself has called them “Jim Crow on steroids.”

Critics also say Biden and his party have not done enough to dismantle the Senate filibuster, which requires 60 votes to pass most bills in the 100-member chamber — a tall order given that the Senate is effectively split 50-50 between the parties, with Vice President Harris casting tiebreaking votes.

On the U.S. border, many have been disturbed by images of Haitian immigrants, seeking asylum during a tumultuous time in that country, being herded and grabbed by White immigration agents on horseback — images that hark back to America’s more openly racist past.

The White House responds that Biden has taken numerous steps to promote racial justice, enact a more humane immigration policy, protect voting rights, advance the rights of women and LGBT people, and embrace a fairer society in general.

Those fights cannot be won overnight, Biden’s defenders argue, especially when they still face fierce opposition from so many quarters.

“The first 10 minutes I was in office, I ended the Muslim ban,” Biden said Friday, adding that he also quickly took actions “advancing racial equity through the federal government, overturning the ban on transgender individuals serving openly in the United States military, establishing the White House gender policy council.”

Biden’s theory — that promoting democracy at home gives the United States credibility on the world stage — faces big tests in coming months. In December, he leads a summit “to defend democratic values.”

Before that, Biden travels to Rome later this month to participate in a meeting of the G-20 industrialized nations, focusing in part on covid-19, and then to Glasgow to join a global summit on climate change. But both on the pandemic and climate change, the U.S. has struggled at times to make significant headway.

Biden argued that while the U.S. cannot claim a spotless record, it can strive to be candid about its faults.

“Leading by example means not pretending that our history has been perfect, but demonstrating how strong nations speak honestly about the past and uphold the truth and strive to improve,” he said. ●

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PRESIDENT JOE BIDEN COMES TO CONNECTICUT FOR A FRIEND, AND HUMAN RIGHTS

By Mark Pazniokas

President Joe Biden visited Connecticut on Friday to promote the hopes of his young presidency, its commitment to human rights and the legacies of two former senators, Christopher J. Dodd and his late father, Thomas J. Dodd.

With digs at the predecessor he never mentioned by name, Biden spoke with passion about the importance of equity and reasserting America as a leader on a world stage after Donald J. Trump's credo of "America First."

"Today, we know that our efforts to defend human rights around the world are stronger, because we recognize our own historic challenges as part of that same fight," Biden said, adding the best way to lead was by example. "The first 10 minutes I was in office, I ended the Muslim ban."

Biden's voice varied from a whisper to a shout, drawing a line from contemporary intolerance and hate crimes to the Nuremberg war trials of 76 years ago, where Thomas Dodd prosecuted Nazis and, more importantly in the view of the president, documented their crimes.

"He made sure no one could deny their own eyes and what they saw," Biden said, waving his finger. "He preserved the truth, ugly and as traumatic as it was, for all of history, so that the horrors of the Holocaust could never be diminished or denied. And evil that we still have to guard against to this day has to be watched."

The occasion was the re-dedication of the University of Connecticut's Thomas J. Dodd Research Center — the 1995 opening of which was attended by President Bill Clinton — as the Dodd Center for Human Rights, an honor to father and son.

The five-hour visit to Connecticut, the first of his presidency outside a commencement address at the Coast Guard Academy in May, is a testament to his relationship with Chris Dodd, whose 30 years in office made him the longest-serving senator from the state.

Cumulatively, father and son served 52 years in the U.S. House and Senate.

At a stop in Hartford and then here at the University of Connecticut, the president sounded notes of what is likely to be the Democrats' pitch for keeping their tenuous control of Congress in next year's midterm elections.

Connecticut is a solid blue state that does not rank high on the list of mid-term concerns. Biden carried the state with 59% of the vote last year, continuing a Democratic streak begun by Bill Clinton in 1992. Biden campaigned for Lamont in 2018, and Lamont was among Biden's earliest supporters, writing a check to the campaign on its first day. Biden lavished praise on Lamont.

"Gov. Lamont, you're one of the finest governors in the country," Biden said. "I'm not being solicitous. That is a fact."

The faint hum of distant protesters could be heard as Biden spoke, their words indistinct. On the road from I-84, a sign promised Trump would be back in 2024.

Biden arrived at midday at Bradley International Airport in Windsor Locks on Air Force One then flew by Marine helicopter to Brainard Airport in Hartford, where the governor, both senators, all five congressional representatives and the mayor greeted him.

Biden spoke at the Capitol Child Development Center in Hartford, defending his attempt to expand the definition of infrastructure spending to social services, including day care. He acknowledged there that his \$3 trillion package might not stay intact. Then he flew by helicopter to UConn, landing in a parking lot.

The Dodd Center holds the letters Thomas wrote from Nuremberg to his wife, Grace — a mix of travelogue, homesick love notes, hopes that Chris would remember him, and ultimately sharp observations about the evil, efficiency and ordinariness of the mass murderers who served Adolf Hitler's Third Reich.

Dodd quoted a prediction his father made in a letter from Nuremberg: "I never will do anything as worthwhile again."

The re-dedication was held on a plaza outside the brick semi-circular façade of The Dodd Center. The renaming was approved by trustees in August, and the celebration was delayed after Biden made clear his wishes to attend.

"To me, as a Holocaust survivor, this is a holy place," said Rabbi Philip Lazowski, giving the invocation.

The heart of the president's speech was about human rights, including his own reversal of a Trump-era ban on transgender Americans joining the military. But it began and ended with remembrances of Chris Dodd and his family.

Biden and Dodd are contemporaries who arrived in Washington D.C. as young men, a generation promising change in a time of tumult. Both won as 30-year-olds: Biden, now 78, to the Senate in 1972; Dodd, now 77, to the House in 1974, then the Senate in 1980.

Men of status and accomplishment in the Senate, they shared the humiliation of crisscrossing a wintry Iowa as second-tier presidential candidates in 2008, watching a trio with thinner resumes capture the imaginations of voters and donors.

They shared a small plane at times, Dodd traveling with a young aide and Biden with his son, Beau.

“We did so because of our deep friendship for each other. But we were also both broke, I might add,” Dodd said. “Today, in today’s highly polarized political world, such joint ventures, regrettably, would be unlikely.”

Biden offered his own memories of sharing the twin-engine prop plane, laughing and telling stories with Dodd on the way to a debate where they were competitors.

With a broad smile, he glanced at Dodd and noted, “Luckily, Chris, I get to travel in a much nicer plane these days.”

Dodd and Biden could not compete in 2008 with Barack Obama, Hillary Clinton or even John Edwards, the one-term senator who had been the vice presidential nominee in 2004. The top-tier trio captured 97% of the vote. Dodd exited the race in 6th place. Obama put Biden and Dodd on his list of potential running mates. He chose Biden, and his career diverged from Dodd’s.

Dodd did not seek re-election in 2010, unwilling to risk the mistake made by his father in 1970 — running one time too many. Weakened by a censure in 1967 over his personal use of campaign funds, Thomas Dodd ran without his party’s nomination, finishing third behind Republican Lowell P. Weicker Jr. and an antiwar Democrat, Joe Duffey. The son was a Peace Corps volunteer during the censure. The father died six months after the election.

Despite the formality of a presidential visit, the Storrs event had the trappings of a class reunion, one with the white-haired Dodd at its center. A thread wove through the congressional delegation and many others in attendance, binding them to Dodd. His former staffers dotted the assemblage, veterans of the Dodd Squad.

Sen. Richard Blumenthal, who succeeded Dodd in the Senate, recalled the warm note his predecessor left in his desk. Sen. Chris Murphy smiled and shared where he was in 1995, when Bill Clinton dedicated the center in

its original iteration: “I was fulfilling my childhood dream. I was interning for Chris Dodd.”

Courtney holds the congressional seat that once belonged to the Dodds. Dodd’s niece, Helena Foulkes, a former senior executive at CVS Health who is running for governor in Rhode Island, introduced DeLauro, who managed Dodd’s first campaign for Senate and served as his chief of staff before running for Congress in 1990.

DeLauro introduced Dodd, hugging him as he took the stage. Hiring DeLauro was one of his best decisions, he said. DeLauro noted that the oldest of Dodd’s two daughters, Grace, was her constituent, a student at Yale.

Dodd mentioned that one of his long-time aides, Edward Mann, had died this week after a long illness. He smiled and recalled hiring Mann out of a Friendly’s. He eventually became the state director for Dodd’s office. Mann’s wake was Friday.

Biden surprised Dodd at a funeral home in Rhode Island when Dodd’s sister Martha died. Biden, then the vice president of the United States, arrived unannounced.

Dodd did not linger after Biden finished his remarks. The president was surrounded by well-wishers, but Dodd glided to an empty sidewalk, hurrying to a car with one companion. Eddie Mann’s wake was at 5 p.m., and Chris Dodd was going to be there. ●

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2021 POWER 25 HEALTH CARE: DR. ANDREW AGWUNOBI

Andrew Agwunobi was so well-liked as CEO of UConn Health, the state’s flagship university decided to give him a second job.

A big one.

Earlier this year, Agwunobi was named interim president of the University of Connecticut, following the sudden departure of former school head Thomas Katsouleas.

And it may not be a bad thing to have a healthcare CEO lead a major university in the middle of a pandemic.

Agwunobi is already making his mark as the school has implemented a vaccine requirement this semester for both students and faculty.

Agwunobi is a pediatrician by training, but his patient for the past six years has been a \$1.2-billion hospital and medical and dental school that consistently produces significant budget deficits, largely driven by “unsustainable” increases in pension and healthcare costs. Earlier this year Agwunobi asked state lawmakers for a 174 million, three-year bailout.

Agwunobi, who previously held hospital system leadership roles in Washington and Georgia, has spent much time in recent years responding to legislators’ demands to find a suitable path forward for the clinical operations of UConn Health, through an envisioned acquisition of or co-investment in John Dempsey Hospital and UConn’s medical group.

UConn Health, which pursued an ultimately unsuccessful merger with Hartford HealthCare in 2009, received several confidential proposals in 2018, but Agwunobi and his board decided not to pursue them.

The continued losses come despite a major expansion of UConn Health’s John Dempsey Hospital facilities during the past decade, backed by more than \$250 million approved by state lawmakers at the outset of the Malloy administration in 2011. ●

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SILENCE IS COMPLICITY

By Len Morris

I recently attended a dedication ceremony at The Dodd Center for Human Rights at the University of Connecticut where President Biden addressed a new generation of activists, students and faculty. The President shared a deeply personal message about the importance of public service while honoring the Dodd family who have been close friends and political allies for decades.

The event commemorated the 75th anniversary of the Holocaust and the President invoked the consequences of ignoring hate speech, lies and violence by remembering his father, a devout Catholic, telling his children at the dinner table that the Nazi trains bearing people to certain annihilation in death camps should have been bombed at the start of the war as soon as the allies knew of the final solution. He taught his children that “silence is complicity.”

The day was sunny and long lines waited for their chance to hear and see the President. When I left my room in the morning to walk over, I was stopped four times by state and campus police who had set up a large perimeter to keep the Presidential entourage safe. Details of the actual start time were kept to the last minute, people had lined up hours early as if waiting to see their favorite celebrity.

Demonstrators vied with heavy secret service presence as we waited to enter. They chanted slogans and denounced the Biden record on a collection of issues: water sovereignty, immigration policy, Haiti, statehood for Puerto Rico and vaccine mandates. There were drive-by trucks trolling Trump flags, fife and drum corps and lots of home-made signs.

The President arrived in one of five enormous helicopters landing on the roof of a parking garage a few hundred yards away. It was very impressive, the crowd watched silently and in awe. It was a reminder that the office of the Presidency carries more than just its occupant.

At times, the loud protests made me angry. They got in the way of the idealism I wanted to feel for a few hours. But in his remarks, President Biden reminded all of us that however imperfect America has been, our democracy is one nation built on the toil and hope of everyone who comes here.

The President warned that today there are fewer functioning democracies in the world than at any time in the past 15 years, with a rise of authoritarianism, demagoguery, racism and the violent suppression of human rights spreading.

The Dodd Center for Human Rights contains the collection of letters and papers of Thomas Dodd who served as the Executive Trial Council for Nazi Criminality at Nuremberg in 1945-46.

FEDERAL RESEARCH MONEY FOR UCONN DOUBLES IN FOUR YEARS

By Robert Storage

The amount of federal monetary awards that went to research at the University of Connecticut has doubled in the past four years, it was announced at the University of Connecticut Board of Trustees meeting Wednesday morning.

In her 12-minute slideshow presentation titled "UConn Research, Envisioning Tomorrow," Radenka Maric, UConn's vice president for research, innovation and entrepreneurship, showed that the amount of federal research dollars earmarked for the university went from \$184 million in fiscal year 2017 to \$375 million in fiscal year 2021.

More than half - or 52% - of the federal awards came from Health & Human Services and, of that amount, the National Institute of Health accounted for 88% of the funding. In addition, 21% of the research funding came from the National Science Foundation.

In addition, Maric's 23-page slideshow also highlighted statistics on the school's Technology Incubation Program, or TIP.

Maric's presentation showed there were five new UConn faculty startups in fiscal year 2021 and that \$8.6 million was raised by those specific UConn TIP startups. In total, Maric's presentation showed there are 62 UConn TIP companies and that \$71 million in funds were raised by those TIP companies. ●

At the end of World War II, with 20 million people dead and 6 million Jews deliberately murdered by the Nazi's, Prime Minister Winston Churchill suggested the 20 high level defendants (Nazi generals and leaders) be lined up and summarily executed. Stalin wanted a brief show trial and executions, but U.S. Supreme Court Justice Peter Jackson had hired Thomas Dodd who had spent 15 months in Europe documenting the genocide and violations of human rights by the Nazi's and together they argued successfully for a full War Crimes Tribunal. The 20 men who stood trial at Nuremberg were forced to listen to extensive testimonies as a full record was created of their barbarism.

Thomas Dodd felt that the world deserved a record of what had happened, that truth coupled with accountability would set an important precedent for generations to come by establishing an international legal framework for bringing to justice those who disregard the human rights of others. It is this same animating idea that has led to the creation of the International Court of Criminal Justice administered through the United Nations that has brought dictators and genocidal criminals to justice.

Truth, accountability, empathy and service, these are fundamental to the functioning of our democracy and these are the values that define human rights for the next generation. The President called on UConn students to engage with the world and to put their skills and educations to work for others.

I have my own history with the Dodd Center, having donated a library of child labor photos and videos that were the product of my 30-year filmmaking partnership with journalist and photographer Robin Romano. As I sat in the audience, surrounded by UConn students who have come to the university from all over the world, I saw the hope and determination in their eyes as the President spoke. The President's natural empathy for others ran like a current through the day. It was touching and it renewed my spirit and commitment to the work of protecting children's rights. ●

DESPITE INTERIM TITLE, AGWUNOBI LEADING UCONN LIKE A PERMANENT PRESIDENT

By HBJ Staff Writer

UConn interim President Dr. Andrew Agwunobi says he's not thinking much about whether his position will become permanent. And the university's board isn't thinking much about replacing him.

UConn's Board of Trustees in May appointed UConn Health CEO Agwunobi as interim president, following former President Thomas Katsouleas' sudden exit after serving in the position for just two years. About six months later, the board hasn't started a search process for a permanent university head, and Agwunobi said he's not approaching the job as someone about to be replaced.

"I'm not acting as a caretaker president," Agwunobi said. "I am working with the board of trustees, the students, the deans, and everyone to move forward on all fronts."

Top priorities include expanding UConn's research and entrepreneurship funding and economic development efforts as Connecticut's flagship university works through — hopefully — the end of a global pandemic that's stymied operations for nearly two years.

Agwunobi is no neophyte when it comes to administrative leadership at UConn.

A physician who also earned an MBA at Stanford University, Agwunobi is also the CEO of UConn Health, a position he's held since 2014.

As head of UConn Health, Agwunobi oversees UConn's \$1.2 billion academic health system, which has been dogged by financial problems over the years, particularly from burdensome unfunded liabilities. UConn Health includes a teaching hospital, faculty practice plan, medical and dental schools, research facilities, and an incubator facility/program for biotechnology startups.

When UConn trustees appointed him May 19 as interim president, they touted his leadership at UConn Health, with board Chairman Dan Toscano praising his efforts to create a financially viable institution amid COVID-19.

Agwunobi said he sees UConn as being largely past the pandemic. Some 11,000 residential students arrived on UConn's main Storrs campus for the 2021 fall semester, and about 30,000 students are taking courses at UConn right now, the interim president said.

Additionally, financial data and projections presented to the board at the end of September are much brighter than the pandemic's early days, when the university shuttered its campus to most residential students.

The \$72 million in federal emergency funds UConn received buoyed the university enough to overcome a \$107.8 million deficit for the 2021 fiscal year, according to UConn documents. UConn intends to apply for \$43.2 million in additional federal American Rescue Plan funds in fiscal 2022, which will enable the institution to end the fiscal year without a deficit.

FOCUS ON RESEARCH, ENTREPRENEURSHIP

State legislators in 2019 mandated that UConn expand entrepreneurship programs, and Katsouleas that year said he planned to double research funding over a 10-year period. Agwunobi said he's very much on board with expanding research, but isn't tying himself to a specific figure.

"I wouldn't necessarily hang our hat on doubling — we might be able to do better than doubling," Agwunobi said, pointing to a record-breaking \$375 million in outside research funding from external sponsors in fiscal year 2021. "But I think what's most important is that we significantly increase our research and do as much research as possible."

To that end, his administration is encouraging UConn researchers to apply for federal and private grants, and is recruiting and working to retain researchers that have research grants, Agwunobi said.

The university's startup incubators will also be a focal point in expanding innovation and entrepreneurship, he said. UConn's Technology Incubation Program (TIP) is currently filled to capacity with more than 45 startups operating out of its Farmington offices.

Meanwhile, UConn's Werth Institute for Entrepreneurship and Innovation established the Stamford Startup Studio, a program on the school's Stamford campus that trains students interested in entrepreneurship how to develop new products, while hopefully creating intellectual property like prototypes and patents.

A key point in expanding innovation and entrepreneurship training for students will be utilizing UConn's ties to businesses large and small, Agwunobi said. Expanding innovation efforts dovetails with economic development, he said.

"We have a lot of relationships," Agwunobi said. "Innovation is a big part of the economic development pillar of our strategic plan, so we'll be working a lot on that."

Agwunobi also sees UConn's urban campuses in Stamford and Hartford as possible drivers of economic development programs.

"The Hartford campus is a really special campus," Agwunobi said. "Its proximity to the capitol, the programs that it has there — both the social work programs as well as the public policy programs — and many other things are done at Hartford... and [the city] really values the Hartford campus." ●

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UConn AGAIN RANKS AMONG TOP 25 NATIONAL PUBLIC UNIVERSITIES BY US NEWS AND WORLD REPORT; YALE NO. 5 AMONG ALL US UNIVERSITIES

By Amanda Blanco

It's college application season, and with that comes essay writing, test taking and tough decision making.

The 2022 U.S. News Best Colleges rankings may make that last part a bit easier.

The rankings, released in September, place several Connecticut universities among the top schools in the country.

UConn celebrated its 11th straight year among the top 25 national public universities. Similarly, to last year, the school tied with Penn State and Rutgers for the No. 23 spot on the national public universities list.

[Education] New Britain schools superintendent, assistant superintendent both leaving in '22 »

UConn has made the top 25 since 2011, climbing to No. 18 in 2017. UConn's ranking dropped slightly in the following years, which school officials attributed to a change in the way schools' financial resources are calculated. In last year's rankings, UConn moved up a spot from No. 24.

"Maintaining our strong position against the challenging backdrop of an unprecedented pandemic is particularly gratifying," UConn President Andrew Agwunobi said in a statement. "It is a testament to the resilience and dedication of UConn's students, faculty and staff, as well as our state's leaders, and the many others who support and sustain the institution's continual drive for quality."

UConn's SAT/ACT 25th-75th percentile scores dropped from 1190-1390 in the 2021 ranking to 1170-1390 in this year's ranking, but the school said it "does not see that as cause for concern," citing its "holistic admissions process." UConn plans to continue its "test-optional" admissions policy, which was announced during spring 2020 and used for the Class of 2025, for the next two incoming class years.

UConn continues to have a student to faculty ratio of 16 to 1. More than half of the schools' classes have less than 20 students, while 15% have 50 or more students.

HOW ARE SCHOOL RANKINGS DECIDED?

To create its annual rankings, U.S. News and World Report considers six main factors. At 40%, student "outcomes" — including indebtedness upon graduation, social mobility indicators and graduation and retention rates — are the most heavily weighted factors in the ranking system methodology. Faculty resources and

expert opinions are each given a 20% weight, while financial resources are weighted at 10%.

Student excellence, weighted at 7%, looks at ACT/SAT tests scores and the proportion of freshmen who ranked at the top of their high school classes. The weight given to alumni donations has decreased from 5% to 3% in the past few years.

For the 2022 list, U.S. News “lowered the threshold of submissions necessary for schools to receive full credit for their SAT/ACT performance,” said the organization. “Schools’ values used in the rankings are only discounted by 15% if the total SAT and ACT scores reported comprise less than 50% of the entering class. Previously, the threshold was 75%.”

“The change was made to reflect the decline of test submissions pertaining to the fall 2020 admissions cycle, which mostly pre-dated the impact of COVID-19,” noted U.S. News.

In 2019, U.S. News dropped schools’ acceptance rates from its methodology. However, the most selective — and wealthy — schools in the nation continue to consistently top national university rankings.

YALE RANKED NO. 5 IN NATION

Yale University in New Haven was again the highest-rated university in Connecticut, coming in fifth nationally after a three-way tie among Columbia University, Harvard University and the Massachusetts Institute of Technology for No. 2, with Princeton University at No. 1. Last year, Yale tied with MIT for the No. 4 spot. All universities ranked in the top 10 nationally are private institutions with acceptance rates under 10%.

Yale ranked first on the “Best Value Schools” list for national universities, while Quinnipiac University in Hamden ranked No. 45.

In “Best National Liberal Arts Colleges,” Wesleyan University in Middletown ranked No. 17, tying with Colby College in Maine, Smith College in Massachusetts, and Barnard College and Colgate University, both located in New York. Trinity College in Hartford took the No. 46 spot on the list, tying with three other schools. Connecticut College in New London also tied with three schools for the No. 50 spot.

Fairfield University ranked No. 3 for “Best Regional Universities” in the North, after Providence College in Rhode Island and Bentley University in Massachusetts. The University of New Haven tied with two other schools for No. 55 on the list.

Among the top public regional universities in the North, Eastern Connecticut State University in Windham ranked No. 24, Central Connecticut State University in New Britain ranked No. 28, Southern Connecticut State University in New Haven ranked No. 32 and Western Connecticut State University in Danbury ranked No. 39.

The United States Coast Guard Academy in New London ranked No.1 for “Best Regional Colleges” in the North, followed by the Cooper Union and the U.S. Merchant Marine Academy, both located in New York. ●

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OUR VIEW: UCONN IS TOPS FOR ITS CULINARY TREATS

By Rebecca Lurye

Amid the myriad challenges faced at the University of Connecticut over this past year, one department managed to cook up some good news for State U.

UConn’s Department of Dining Services recently was recognized by Food Management magazine as a “Top 25 College Dining Power Player.”

To those not familiar with the industry, this is similar to UConn basketball teams being ranked, or the university as a whole making a top 25 list as part of U.S. News & World Report’s college guide.

For those who cook and eat at UConn, this is a big deal.

Of course, older alumni might recall a college dining scene similar to the stereotypical experience most associate with school cafeterias.

You know, the one — as Adam Sandler sings in his comedy hit “Lunch Lady Land” — where “yesterday’s meatloaf is today’s sloppy joes.”

These days, university dining is as much about quality, diversity and nutrition as it is about feeding as many students at once as possible.

According to UConn officials, the university has one of the largest, self-operating food operations in the country, meaning those who cook, serve and plan are actual UConn workers.

As part of those operations, UConn utilizes locally grown produce and has a deal for the freshest of seafood to be served. Basically, a fish swimming in the ocean can be on a student's plate the next day — bad news for the fish, but good news for the diner.

UConn's dining services also takes into account the vast array of diversity on campus, both ethnically and dietary.

In short, the needs of just about any student can be met at UConn's cafeterias ... make that, dining halls.

Cooks at UConn are chefs and they also look the part, with snazzy uniforms that remind folks of high-end restaurants, not dining halls.

UConn has made a name for itself in many ways in recent decades. Its basketball programs are top-notch. It's regularly ranked on public university lists.

And now, its food is award-winning too. These days, well-fed students are key to attracting top academic talent and keeping them there. ●

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WHITE STUDENTS HAVE AN ADVANTAGE IN COLLEGE ADMISSIONS, SAYS NEW SURVEY

By Susan Adams

More than two-thirds of white high school students say they rely on family and friends for help with college admissions. By contrast, only 38% of Black students say their families give them admissions advice.

Many American appear to think that Black students benefit from college admissions offices that want to increase diversity on predominantly white campuses. But a new survey shows that white applicants have a significant advantage over their Black peers.

The survey was conducted in September by Art & Science Group, which advises colleges on their enrollment strategies. The Baltimore-based company used Qualtrics, a market analytics company owned by SAP, to administer the online survey. The respondents were 734 American high school students who said they planned to apply to attend a four-year college in the fall of 2022. The students attend both public and private schools nationwide.

Art & Science principal David Strauss says his company conducts surveys in order to better advise its clients on their strategic approach to higher education. That includes how best to admit a diverse class of students. "We were trying to find out where the pressure points are," he says.

Though he's not surprised by the survey's results, he believes they are important. Two other findings: White and Asian students plan to apply to more colleges (four) than Black students (three). White students are also more likely to have gone on campus tours (38% vs. 23%). Says Strauss, "This is another piece of data that tells us advantage begets advantage."

Vern Granger, director of admissions at University of Connecticut and the incoming board chair of the National Association for College Admission Counseling (NACAC) agrees that the survey results are not surprising. But they're important. "The survey speaks to the structural inequities that we already know exist in the system," he says.

UConn is combatting those inequities in several ways. Its Alliance Pathway program works with 69 high schools throughout the state to bring disadvantaged students to the UConn campus for tours at no cost to the students. The struggle to find the time and resources to take campus tours "is one of the many barriers that impacts education for Black or brown or first generation students," he says.

SHOULD WE FIRE ALL THE RACISTS?

Like most colleges and universities, UConn waives its \$80 application fee for disadvantaged students. "A lot

of students are not aware that they can get help affording to apply to a university,” he says.

The Art & Science survey concludes: “colleges and universities will need to find more creative ways to reach students who are less likely to have social capital and work harder to ensure that these students understand what is distinctive about the institution and why these distinctions should matter to them as they choose where to apply.” ●

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CHRIS DODD: PROTECTING DEMOCRACY AND SECURING HUMAN RIGHTS STARTS WITH EDUCATION

By Christopher Dodd

This past week, President Joe Biden marked International Human Rights Day by convening leaders from the private sector, government and civil life to discuss the challenges and opportunities facing our democracy and those around the world. Authoritarianism and threats to democratic institutions are on the rise, and the next generation of civil and elected leaders must be prepared to defend and advance the cause of human rights and free societies.

By hosting the Summit for Democracy, President Biden was reinforcing the return of American global leadership at a time of unprecedented peril. Let this moment also remind us that the most significant resource for renewing democracy and securing human rights is civics education.

Throughout our friendship, including our time together on the Senate Foreign Relations Committee, President Biden has long recognized that democracy and human rights are intertwined and that both require an unflinching commitment to working with partners across the globe to ensure peace and justice for all. As we face

the most daunting challenge to democracy in a generation, I know he agrees that we have both the opportunity and the responsibility to create new civics educational approaches that support democracy and advance human rights.

Nine weeks ago, the president spoke on the UConn campus to dedicate the Dodd Center for Human Rights, and sounded the alarm, noting that, “we see human rights and democratic principles increasingly under assault,” and calling on our students to “discover and defend human rights as the passion and purpose of our lives.”

“We need you,” he told students in attendance, “we need you badly.”

While the struggle for democracy and human rights will ultimately rest on the shoulders of the rising generation, it is the responsibility of leaders today to equip them with the knowledge, skills and values necessary for this great task. This is the fundamental purpose of the Dodd Center and I am proud that UConn has become a leader in promoting human rights education. Others are doing so, but more of our colleges and universities need to embrace this responsibility to democracy, rather than shy away from the hard work of advancing equity and social justice for fear of political blowback.

As important as higher education is, the real hope for our democracy rests within our communities and our K-12 schools. That’s why I’m joining Secretary of Education Miguel Cardona in a conversation, hosted by UConn as part of the Summit for Democracy, about how our schools can, through civics and human rights education, become engines of our democracy. Young people are not just future citizens, they are citizens today and our schools must do more to ensure that they understand their rights and responsibilities in making our democracy work. We must begin by reversing the decades-long trend of neglecting civics, but must also include new models for empowering students, teachers and families to build cultures of human rights in their schools and communities.

At the Dodd Center, the president connected the global struggle for human rights to our own democratic struggles at home. He echoed one of the authors of the Universal Declaration of Human Rights, which we celebrate today, Eleanor Roosevelt. “Where, after all,

do universal human rights begin?" Mrs. Roosevelt asked. "In small places, close to home." She continued, "Unless these rights have meaning there, they have little meaning anywhere. Without concerted citizen action to uphold them close to home, we shall look in vain for progress in the larger world." The president's decision to convene this Summit for Democracy will serve as a catalyst to ensuring human rights at the center of our nation's foreign policy. The next step will be to shore up the true foundations of our democracy by placing civics back at the center of our nation's education policy.

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UCONN MAP TRACES HISTORY OF NATIVE AMERICAN LAND IN CONNECTICUT

By Jordan Fenster

If you're in Guilford, you are probably sitting on land where the Menunkatucks lived.

West Hartford was where the Sicaogs once called home. The Podunks were in what is now South Windsor and Vernon. What is now Bridgeport, Stratford and Milford was once Wepawaug land.

The University of Connecticut library has published a digital "mashup" map that shows what native American tribes were on land now managed by Connecticut towns and municipalities.

Drawn by artist Hayden Griswold, the map was made at the behest of an organization called the Connecticut Society of the Colonial Dames of America — an group that still exists.

It was based on a map drawn by John Chandler in 1705 that relied on even older maps. The earliest known map of Connecticut, according to UConn anthropologist Kevin McBride, was drawn in 1614.

Now an effort called LandGrabCT is underway to document the land, both in Connecticut and west of the Mississippi River, that was taken from native peoples and sold to create the University of Connecticut.

"There's this act in 1862, called the Morrill Act, which established land grant universities," said Garrett McComas, a postdoctoral fellow at UConn's Greenhouse Studios.

The act assigned strips of land across the country to various states. The more congressional representatives, the more strips of land a state was assigned. That land, on which native peoples had been living, would then be sold to create an account through which universities would be funded.

"So a land grant university is the beneficiary of these sold strips of land," McComas said. "They get a portion of the base amount, which for Connecticut is \$135,000."

In total, 178,190 acres of land in Nebraska, Michigan, California and Montana were sold to create the University of Connecticut, according to LandGrabCT.

"It's really looking at the dispossession of indigenous people, the dispossession of their land," McComas said. "And then the way that dispossessed land was used to fund the land grant university system."

MOHEGANS, MOHICANS AND PEQUOTS

The LandGrabCT project is focused on land in other states sold to create land grant universities like UConn, but McComas noted that the property on which the university itself sits was once native land.

"They have made acknowledgment statements that acknowledge the tribes that lived on the land the university is physically located on," McComas said. "So that would be the land within Connecticut's borders, and the tribes that are associated with those lands."

The UConn library's mashup map, which digitally overlays modern town borders onto Chandler's 1705 map, shows that Mohegans lived where UConn's primary campus now sits.

But McBride said it's not so simple.

"UConn and, of course, other institutions are on formerly native lands. I think it's sort of disingenuous and a little simplistic to say that they stole the land," he

said. "Of course, we know that was the outcome, but it was a complex process."

However, Rodney Butler, chairman of the Mashantucket Pequot Tribal Nation, did not hesitate to use the word "stole."

"The end result was that they took the land, no matter what the intent was," he said. "The heart of it though was about economics, whether that's land or the wampum or fur trade."

The 1935 reprint of Chandler's map was included as part of a booklet explaining Connecticut's Native American history. That booklet suggests the Mohicans in what is now New York state and the Mohegans of Connecticut were once a single group, though McBride said that is outdated and likely false.

McBride's specific area of study is the Pequot War, which he said started as the Pequots attempted to gain control of the region's fur and wampum trade.

"By the time the English arrived in 1633 into the Connecticut Valley, the Pequots were sort of at the height of their power," he said. "They controlled the Connecticut Valley, they controlled the Long Island coastline, and they began to run afoul of the English who ignored Pequot claims through territory by right of conquest."

DISEASE

The Pequots were already suffering by the time the Pequot War began. When asked how many people lived in Connecticut before the first permanent settlers arrived, McBride said the real question is "how many were here before the first smallpox epidemic in 1633."

There were, he said, probably about 8,000 Pequots alone before the epidemic, and perhaps 4,000 after it.

"Estimates vary on the mortality rate, anywhere from maybe 50 to 90 percent," he said.

It's important to remember, McBride said, that disease and conflict had reduced the population of Native Americans in Connecticut. "Their numbers became thin," he said.

And though the Pequots and Mohegans did not take part, many tribes in New England became part of a coalition "that fought against the English to, in theory,

drive them into the sea." That became known as King Phillip's War.

The process, however, through which the Pequot lost their land was not so slow, Butler said. It was spurred by the Treaty of Hartford, signed Sept. 21, 1638, between the English colonists and the Narragansett and Mohegan people.

That treaty stipulates a payment to the English for every Pequot man, woman and child, and that "the Pequots will no longer live in their homelands, and the Narragansetts and Mohegans may not live in the former Pequot territory."

Before the treaty, the Pequots controlled 250,000 acres of land, according to Butler.

"We went from 250,000 to zero on the signing of that treaty," he said.

BUYING THE LAND BACK

There was an ebb and flow to the Pequot land holdings. Butler said the tribe received their first parcel back in 1651. It was 200 acres in Noank.

"The reservation in Noank was the first formal reservation established in the continental United States," Butler said. "We never lost our identity."

That was increased to 2,000 acres in 1666, and then slowly sold to white farmers, illegally, until the tribe was down to 200 acres in 1856.

In the 1960s, renewed interest in returning the land to native people encouraged the Pequots, under the leadership of then-chairman Skip Hayward, to sue for those lands that had been illegally sold in the 1800s.

"From '75 to '83, we were in and out of court fighting for our land," Butler said.

After the tribe was formally, federally recognized, a settlement in 1983 returned about 900 acres.

Since then, the tribe has been slowly acquiring more land. There are 1,600 acres "in trust" as official, sovereign land and another 2,000 or so acres owned by the tribe, but not yet officially in trust.

"The ultimate goal is, eventually, get all of that into trust, so that we have the sole authority in managing those lands," Butler said. ●

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