

SPOTLIGHT ON SERVICE, SACRIFICES

First Responders Garner Well-Earned Appreciation

BY DEVER POWELL

NIH rose to the worthy occasion of celebrating Oct. 28 as National First Responders Day. In his proclamation, President Joe Biden called upon the people of the United States “to observe this day with appropriate programs, ceremonies and activities to honor our brave first responders and to pay tribute to those who have lost their lives in the line of duty.”

Throughout October, NIH honored its first responders in the Office of Research Services (ORS) Division of Police (DP) and Division of Fire and Rescue Services



Division of Police staff are congratulated by NIH Chief Security Officer Bill Cullen (3rd from l), ORS Director Colleen McGowan (c) and NIH Deputy Director for Management Dr. Alfred Johnson (2nd from r).

PHOTO: CHIA-CHI CHARLIE CHANG

(DFRS)—two groups who provide heroic and continuous 24-7 service 365 days a year in support of the NIH mission.

During the pandemic and at great risk to themselves and their families, they served without any breaks in service, on the Bethesda campus and at remote locations in

McGowan said, “It is time to spotlight the countless sacrifices our police and fire personnel have made and their unyielding commitment to safety and security at NIH.”

Dr. Lawrence Tabak, performing the duties of NIH director, had promoted the

Frederick, Md., and in Montana.

Everyone can remember the beginning of Covid-19, when the nation and world implemented social distancing. Recalling those early days of spring 2020, ORS Director Colleen

SEE **RESPONDERS**, PAGE 4

WHAT THE BODY REMEMBERS

Virologist Delves into Covid Immunity

BY DANA TALESNIK

An ongoing quandary in the Covid-19 pandemic is immune response. How well and for how long does the body’s immune system remember a previous infection or vaccination to help ward off, or minimize symptoms during, a future infection?



Dr. Shane Crotty

Such questions continue to drive the research of Dr. Shane Crotty, virologist and professor at the La Jolla Institute for Immunology (LJI) at UCSD School of Medicine. He discussed adaptive immunity at a recent NIAID Covid-19 scientific interest

SEE **IMMUNITY**, PAGE 6

GOING GREENER

NIH Begins Conversion to Zero-Emissions Fleet

BY ERIC BOCK

NIH has begun the transition to a zero-emissions vehicle fleet, as required by an executive order. The transition must be completed in the next 5 years.

In December 2021, President Joe Biden signed Executive Order 14057, “Catalyzing Clean Energy Industries and Jobs Through

SEE **FLEET**, PAGE 8



NIH charges toward a zero-emissions fleet.



NIDCR takes oral health message on the road. See story, p. 2.

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Stroud To Lecture on Stress, Adversity and Resilience

Dr. Laura Stroud of Alpert Medical School at Brown University and the Miriam Hospital will deliver a talk, “From the Mouths of Babes: What Can Research on Babies, Moms, Stress, and Substance Use Tell Us About Resilience?” on Tuesday, Dec. 13 from 2 to 3:15 p.m. ET. This virtual presentation is the 2022



Dr. Laura Stroud

Stephen E. Straus Distinguished Lecture on the Science of Complementary Therapies, sponsored by the National Center for Complementary and Integrative Health (NCCIH). To register, visit <https://bit.ly/StroudLecture>.

Stroud is professor of psychiatry and human behavior at Alpert Medical School and director and senior research scientist at the Center for Behavioral and Preventive Medicine of The Miriam Hospital.

Stress and adversity during early development can exert a profound and persistent imprint on our physiology, brain and health across the lifespan. This can lead to long-term health outcomes such as substance use, depression, obesity and cardiovascular disease. Stress and adversity may be transmitted from one generation to the next, but protective experiences may prevent or mitigate these effects.

Stroud will provide examples of findings from her laboratory and of ongoing studies at the COBRE Center for Stress, Trauma and Resilience. Topics of focus include intergenerational transmission of maternal experiences and behaviors (particularly substance use) in fetuses and babies; elucidation of pathways and interventions to foster resilience; intervention during sensitive periods of development; and the broader “exposome.” The need to build resilience and mitigate health inequities at structural and community levels will also be discussed.

This annual lecture honors NCCIH founding director Straus and is supported by the Foundation for the National Institutes of Health with a generous gift from the Bernard Osher Foundation.

NIH Leave Bank Open for Enrollment

Fall Open Enrollment for the NIH Leave Bank has started and runs until Dec. 12. Membership will begin on Jan. 1, 2023.

The Leave Bank is a pooled bank of donated annual

and restored leave available to eligible members. It acts like a safeguard for your paycheck and amounts to paid leave for members who have exhausted all of their own sick and annual leave and are affected by a personal or family medical emergency.

To become a Leave Bank member, access the Integrated Time and Attendance System (ITAS) during Open Enrollment and select “Leave Bank Membership” to enroll. If you are a 2022 Leave Bank member, your membership will automatically continue into 2023, unless you opt out in ITAS during Open Enrollment. The yearly membership contribution is one pay period’s worth of annual leave accrual. The membership contribution will be waived automatically if you lack sufficient leave.

For more information, visit <http://hr.nih.gov/leavebank> or contact the Leave Bank Office at (301) 443-8393 or LeaveBank@od.nih.gov.

NCATS’s Rutter Receives Impact Award

Dr. Joni L. Rutter, director of the National Center for Advancing Translational Sciences (NCATS), was honored recently with a 2022 Leading for Impact—Women in Leadership Award at the fifth annual Leading for Impact—Women in Leadership Conference. Rutter was selected by a panel of current and former government and industry leaders from across the federal information technology sector.



NCATS Director Dr. Joni Rutter

The award, presented Nov. 1 at the National Press Club in Washington, recognizes women leading organizations and mission-focused strategic programs across the federal, military and consulting communities.

For more information about the award, see <https://impact.fedhealthit.com>.

Federal Benefits Open Season Underway

Ends Dec. 12

The Benefits Open Season runs now through Monday, Dec. 12. Don’t miss this chance to make an Open Season election. Unless you experience a Qualifying Life Event during the year, the annual Open Season is your only opportunity to enroll, cancel enrollment or make a change to your enrollment for the participating programs.

For detailed information, view the Open Season announcements at <https://bit.ly/3UIEyQq>.

The three participating programs are:

- **Federal Employees Health Benefits.** To enroll, cancel or change enrollment, you must use myPay* at <https://mypay.dfas.mil/mypay.aspx>. Open Season elections will be effective on Jan. 1, 2023. Current enrollment will automatically continue into next year, if you do not take any action.

(*Exception: If you will retire between now and Jan. 3, 2023, do not use myPay to make your Open Season change. Instead, you must submit a hard copy Health Benefits Election Form, SF 2809, along with your retirement paperwork to your benefits specialist.)

- **Federal Employees Dental and Vision Insurance.** To enroll, cancel or change enrollment, you must use the BENEFEDS Portal at www.benefeds.com or call 1-877-888-3337 (TTY: 1-877-889-5680). Open Season elections will be effective on Jan. 1, 2023. Current enrollment will automatically continue into next year, if you do not take any action.

- **Flexible Spending Accounts.** To enroll for 2023, you must use the FSFEDS website at www.fsafeds.com or call 1-877-372-3337 (TTY: 1-866-353-8058). Current enrollment will not automatically continue into next year. If you want an account in 2023, you must enroll during Open Season. Elections will be effective on Jan. 1, 2023.

Direct all questions to AskBenefits@nih.gov or your benefits contact. To locate your contact, visit <https://hr.nih.gov/contacts/benefits>.

2022 NIH Director’s Awards Posted

An NIH Director’s Award is the most prestigious honor at NIH to recognize the achievements of institutes, centers and offices. Each nomination undergoes a rigorous review process that includes each IC director, the NIH awards review committee and selection by the NIH director for special recognition.

NIH has highlighted the remarkable accomplishments of more than 1,900 awardees from the 2021 calendar year in a virtual format. The awards site, developed in partnership with IC leadership across the agency, features a video with Dr. Lawrence Tabak, performing the duties of the NIH director, and Julie Berko, chief people officer and director of the Office of Human Resources, discussing the meaning of the NIH Director’s Award.

NIH’ers are invited to congratulate the 2022 recipients on their outstanding contributions in research, administration, mission support, mentorship, clinical care, Commissioned Corps, work/life and well-being, equity, diversity and inclusion—all in support of the NIH mission.

To browse the recipient list and watch messages from key leaders, visit: <https://directorsawards.hr.nih.gov>.

On the Road With NIDCR—Communicating Advances, Challenges in Oral Health

BY MICHAEL SOMES

If a comprehensive report on America’s oral health is released, but health professionals don’t hear about it, does it make a sound? Can they respond to it if they don’t hear about it? Rather than pondering those questions, NIDCR leadership hit the road to meet with students, researchers, health care professionals and public health practitioners to talk about *Oral Health in America: Advances and Challenges*.

The report, released in late 2021, covers the past 20 years of oral health in the United States and provides a road map for improvement.



Dr. Jennifer Webster-Cyriaque (I) attends the University of Michigan’s Dental School Research Day.

Compiled and reviewed by NIDCR and a multidisciplinary team of more than 400 experts, it draws on information from public health research and evidence-based practices.

The document reveals that even before the pandemic, there were plenty of challenges for the oral health of the nation.

“The people I’ve talked to—researchers, public health officials, and oral health professionals—are looking for ways to take ownership of our oral health challenges,” said NIDCR director Dr. Rena D’Souza. “There’s great enthusiasm for contributing to good public health and good oral health.”

According to the report, disparities in health and health care access continue to exist and result from many factors, including socioeconomic, race and ethnicity and age.

“There is a clear interest in disparities,” among the report’s audience, said NIDCR deputy director Dr. Jennifer Webster-Cyriaque. “There is also an



Dr. Rena D’Souza (c) at the University of Buffalo School of Dental Medicine

appreciation of the report’s comprehensive nature, as it shares the status of dental, oral and cranio-facial disorders across the lifespan and provides insights into emerging science and technology. Importantly, it provides a lens such that across the country individuals can see how they may be able to help in some way through the research that they do or the care that they provide.”

Since mid-January, D’Souza, Webster-Cyriaque and Dr. Renée Joskow, senior advisor to the NIDCR director, have reached thousands of people through presentations focusing on the report in venues ranging from dental schools, state and county health summits, and partner and professional organization meetings. The leadership team has presentations scheduled through the end of the year.

“It’s been an incredible experience hearing stories from the field and sharing what we’ve learned about the state of oral health [in] the



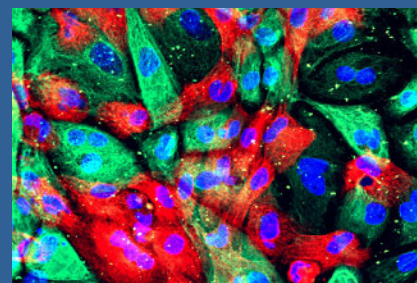
D’Souza speaks at an American Dental Education Association meeting.

nation,” according to Joskow, “The level of interest and excitement is palpable.”

A common observation among NIDCR leadership was that the presentations accomplished more than getting NIDCR’s own messages out; they were great opportunities to hear from others in the oral health community.

“This forum allows firsthand feedback and sharing of views, particularly on workforce and individual community needs,” observed Webster-Cyriaque.

“I joined NIDCR as director right in the middle of the pandemic, so it’s exciting to be out meeting people in person,” remarked D’Souza. “Traveling gives us a window to the outside world [and our] presentations give us access to a plethora of people, all of whom have something unique to offer.” **R**



ON THE COVER: *Wild type human prostate cells from an organoid (a man-made construct that resembles an organ). These cells come from a xenograft where they serve as controls for the study of primary prostate cancer tumor cells, which are also injected into mice and then extracted for characterization.*

IMAGE: NIH

The NIH Record

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Responders

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celebration via an NIH-wide email message and provided the community an opportunity to reach out directly to DP and DFRS staff.

“We see you and appreciate you,” Tabak wrote, opening the way for others to express their well-wishes similarly.

The result was an influx of emails sent



to the first responders, conveying heartfelt and detailed anecdotal thanks. In response to the outpouring, Acting NIH Police Chief Leslie Campbell said, “More than a duty, it is an honor to serve this diverse and vibrant community. Your kind words mean a great deal and we truly appreciate your thoughtfulness. Our mission is simple: to keep the NIH community safe and secure.”

Acting DFRS Director Mat Chibbaro added, “The NIH Fire Department is very proud of its nearly 70 years of service to NIH, its mission, staff, patients, visitors and the surrounding communities. We do what we do and expect no accolades, but they are always greatly appreciated, especially those with specific success stories of our outstanding fire and rescue services both on the



NIH first responders were celebrated all month, acknowledging the dedicated selfless service they provide every day, all day.

PHOTO: CHIA-CHI CHARLIE CHANG

NIH campus and in Montgomery County.”

McGowan shared weekly ORS first responder profiles with ORS staff in a well-received awareness campaign. NIH’s Medical Arts team designed colorful banners now installed across the Bethesda campus.

On Oct. 28, the official day of recognition, NIH Deputy Director for Management Dr. Alfred Johnson joined McGowan and Bill Cullen, ORS associate director of security and emergency response, to host a reception in Bldg. 31 for first responders and staff, including members of NIH leadership.

The festive event culminated the month of honoring the selfless service of NIH’s first responders.

Learn more about them and their work via the NIH Gratitude for Our First Responders website: <https://bit.ly/3EAfLbv>.

Also, it is never too late to send them emails of gratitude and appreciation: Fire Department—FireDepartmentFullStaff@mail.nih.gov Police—ORSDDPolOfc@mail.nih.gov.



NIAID Director Dr. Anthony Fauci (6th from l) stands with NIH Police in Bldg. 31.

PHOTO: JOSEPH BROU

SCHOR, RUTTER APPOINTED

Key NIH Positions Officially Filled

Dr. Lawrence A. Tabak, performing the duties of NIH director, recently filled two key NIH positions.

On Nov. 6, Dr. Nina F. Schor officially began her tenure as NIH deputy director for intramural research (DDIR). She had been serving as acting DDIR since Aug. 1. On Nov. 8, Dr. Joni L. Rutter was named director of the National Center for Advancing Translational Sciences (NCATS). She had served as NCATS acting director since April 2021.

As DDIR, Schor leads the NIH Intramural Research Program (IRP) and facilitates collaboration among the 24 institutes and centers that are a part of NIH's research community. In addition, she is responsible for selection and approval of new NIH principal investigators, human subjects research protection, research integrity, technology transfer and animal care and use for the IRP.

Schor will also spearhead efforts to train the next generation of biomedical and behavioral researchers at NIH, as well as foster a diverse and inclusive culture across the IRP.

With extensive experience as an educator, scientist, clinician and administrator, she joined NIH in January 2018 as deputy director of the National Institute of Neurological Disorders and Stroke (NINDS); in May 2021, she also assumed the role of NINDS acting scientific director.

Prior to joining NIH, Schor worked at the University of Rochester, where for nearly 12 years she served as chair of the department of pediatrics and pediatrician-in-chief of Golisano Children's Hospital.

Before that, she spent 20 years building her academic and scientific career at the University of Pittsburgh, culminating with appointments as associate dean for medical student research and chief of the division of child neurology in the departments of pediatrics and neurology.

Schor earned her Ph.D. in medical biochemistry from Rockefeller University and her M.D. from Cornell University Medical College. She completed residency and postdoctoral fellowship training in pediatrics, child neurology and molecular biochemistry and pharmacology at Harvard University Medical School and Boston Children's Hospital. There she began her three-decades-long NIH-funded

research efforts focused on targeted therapy for neuroblastoma, a type of pediatric cancer, and neuronal cell death caused by oxidative stress, which occurs when harmful forms of oxygen molecules damage cells.

As NCATS director, Rutter oversees a diverse portfolio of research activities focused on improving the translational process of turning scientific discoveries into health interventions.

In addition, she directs innovative research to advance diagnoses and treatments, including gene therapies, for some of the more

than 10,000 known rare diseases. She leads labs that drive team science with the private sector to create and test innovations for improving drug development.

Rutter joined NCATS in 2019 as deputy director. She has championed approaches for leveraging real world data and artificial intelligence/machine learning to address public health questions rapidly.

Rutter led an initiative that used

data from health care systems to calculate approximate health care costs for the millions of people with rare diseases. This and related initiatives prompted recommendations to reduce the economic and medical burdens facing this community.

Taking the NCATS helm during the most critical public health challenge of our time, Rutter also led the National Covid Cohort Collaborative from inception; it is now one of the largest collections of secure and deidentified clinical data in the United States for Covid-19 research.

Rutter spearheads efforts to enhance diversity, equity, inclusion and accessibility among the translational science workforce and makes efforts to reduce health disparities through translational science approaches.

Prior to joining NCATS, she established the scientific programs within the NIH All of Us Research Program to advance precision medicine. She also served as a division director at the National Institute on Drug Abuse.

Rutter earned a bachelor's degree in biology from Eastern Nazarene College in Quincy, Mass., and a Ph.D. in pharmacology and toxicology from Dartmouth Medical School. She completed a postdoctoral fellowship on gene-environment interactions in breast, ovarian and melanoma cancers at the National Cancer Institute. **R**



Dr. Nina Schor (l), NIH deputy director for intramural research, and Dr. Joni Rutter, NCATS director

Immunity

CONTINUED FROM PAGE 1

group virtual seminar.

Crotty's lab has led groundbreaking research on viral immune memory. In fact, his team's research on Covid-19, in collaboration with Dr. Alessandro Sette at LJI, helped inform vaccine efforts worldwide.

In the early months of Covid-19, when so much was unknown, Crotty's lab found that people with average, non-hospitalized Covid-19 infections made antibodies to the spike protein. In a co-authored paper in *Cell*, his team confirmed that after someone contracts SARS-CoV-2, the virus that causes Covid-19, the body activates all three components of adaptive immunity—CD4 “helper” T cells, CD8 “killer” or suppressor T cells and neutralizing antibodies.

These and related studies signaled to vaccine manufacturers that they were on target in developing spike-only vaccines.

Remembering Covid

Immune memory is tough to predict and requires waiting for a set endpoint. Time was of the essence though in trying to determine whether past infection protected against reinfection.

Following a cohort, Crotty's lab found that most participants still had antibodies in the blood at eight months post-infection.

Antibody titers “are relatively low in infected people, but something like 90 to 98% of people do become antibody positive,” said Crotty. “Those titers drop over a relatively short timeframe but by six months, they're relatively stable.”

Data in the literature supports that a

year to two years out, these infection-induced antibody titers are stably maintained.

“The CD4 responses to this virus are quite robust,” Crotty said. “Almost 100% of people were positive initially and still 90% of people were positive at six to eight months [with data] suggesting that both CD4 and CD8 both would be long-lasting.”

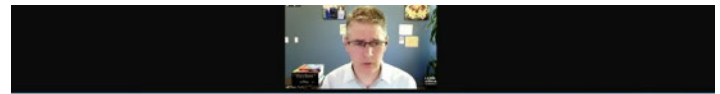
That 2020 study followed 188 people, then by far the largest study of its kind involving any acute infection. Most surprising, he said, was that people had more memory B cells—the cells that create antibodies—several months post-infection than at one month post-infection.

Results pointed to substantial immune memory following Covid-19 infection, enough to “protect at least from serious SARS-CoV-2 infection for years into the future,” he said. “This was before the existence of variants.”

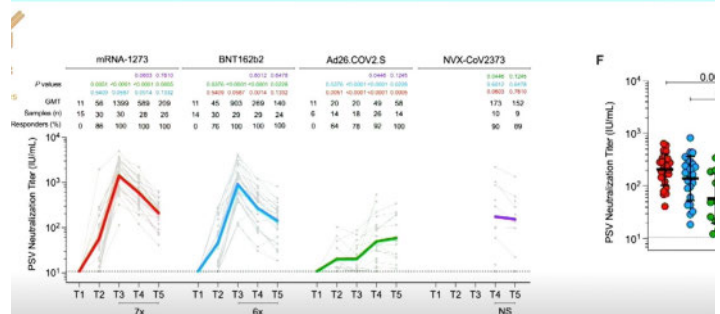
Four Vaccines Go Head-to-Head

Subsequent studies showed that Covid-19 infection itself did not elicit high and durable neutralizing antibodies, given the emergence of new strains. Meanwhile, growing evidence pointed to T cells helping to protect against severe disease.

Therefore, “it's reasonable to consider that hospitalization-level Covid-19 is



Comparison of immune memory to four COVID-19 vaccines



In a head-to-head comparison of Covid-19 vaccines, the RNA vaccines elicited high neutralizing antibodies quickly then decayed over six months. J&J did the opposite, eliciting low antibody titers that increased over time. Out six months, Novavax was on par with the RNA vaccines.

by four Covid-19 vaccines: the two mRNA ones—Moderna and Pfizer-BioNTech; the viral vector Johnson & Johnson (J&J); and the protein-based Novavax.

“The RNA vaccines are fantastic at eliciting high neutralizing antibody titers quickly and consistently across individuals, but with a dramatic decay over a six-month period,” said Crotty. And they continue to decay for 10 months after a two-dose regimen.

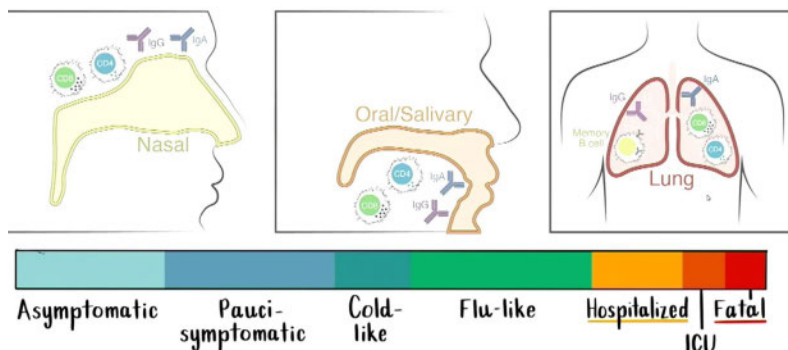
Six months after vaccination, Novavax showed antibody titers comparable to the RNA vaccines, which were significantly higher than people get after infection or from a single dose of J&J. Interestingly, though, the J&J vaccine elicited low antibody titers one month after vaccination, those titers increased over time and that cohort had higher on average antibodies six months post-vaccination.

“This is literally the opposite trend of what you get with RNA vaccines,” noted Crotty, “indicating that these vaccine platforms are engaging different immunological mechanisms of action.”

The RNA vaccines and Novavax elicited good CD4 T cell responses up to six months. All four vaccines generated B cell memory, though the RNA vaccines performed best. Interestingly, memory B cells continued to increase three and six months out, as opposed to the antibody titers, which declined over time—a trend also seen post-infection.

Notably, Crotty's team discovered a new type of helper cell—Tfh, a subset of CD4 T cells that are critical in the body's fight

Anatomy of adaptive immunity to SARS-CoV-2



SARS-CoV-2 replicates quickly in the nasal and oral cavities, rapidly causing asymptomatic to cold-like disease. But it's slower to infect the lungs. In severe cases, hospitalizations generally occur two weeks after symptom onset, Crotty said.

prevented by any decent combination of antibodies, memory B cells, CD4s and CD8s,” said Crotty.

Earlier this year, Crotty's lab published a study that compared immune memory generated

against Covid-19. It turns out, the vaccines all generate Tfh cells. “They’re certainly required for all of the Omicron [variant] neutralizing antibodies you currently have circulating in your blood,” said Crotty.

“I think the potency of RNA vaccines for eliciting neutralizing antibodies—and being so highly protective so quickly—really comes down to their impressive ability to prime CD4 T cell responses and drive Tfh cell differentiation,” he added.

In addition to generating Tfh cells, he said, the vaccines also generate memory Tfh cells, important for booster responses at subsequent time points.

Beyond Blood: Looking at Tissues

Testing for antibodies in the blood measures circulating memory. Does the human body have additional layers of defense?

Crotty collaborated with Dr. Donna Farber’s lab at Columbia University to test whether past infection elicited tissue-resident memory. Looking at donated tissue from four people who died from non-Covid causes and had a previous unremarkable case of Covid-19, they found all had tissue-resident memory CD4 T cells and virus-specific memory CD8 T cells in the lungs.

This study occurred before Covid vaccines were available, confirming the four people had infection-induced immunity. When people are vaccinated, they get the benefit of hybrid immunity, getting tissue-resident memory cells from previous infection as well as strong circulating memory generated by vaccination.

“For me, having been trained as a virologist, I think it’s always critical to think of protective immunity in the context of the anatomy and pathogenesis of the particular viral infection that you are trying to deal with,” said Crotty. “With SARS-CoV-2, this is clearly a virus that is very rapid at replicating in nasal and oral cavities and very rapid at causing asymptomatic to cold-like disease, and so it’s a rather difficult virus to stop quickly.

“But in terms of preventing death and hospitalizations, it’s actually a relatively slow pathogenesis, dependent on infection in the lung, [which often doesn’t occur until] two weeks post-infection or symptom onset.”

So it’s important to distinguish between protecting against infection versus serious disease, he said, and to keep in mind the different tissues and organs affected by infection.

Immune Memory from Vaccines

Crotty’s studies have shown Tfh cells start helping memory B cells early in the immune response, as early as the first few days, signaling the B cells to undergo mutation and proliferation.

“All of your Omicron neutralizing antibodies in your blood are really coming from this process,” said Crotty. The B cells recognize the ancestral strain from the original vaccine and then those B cells mutate and bind to Omicron, even though they hadn’t yet encountered that variant before.

Structures called germinal centers, a source of generating B cell diversity, facilitate this evolutionary process.

“The presence of one virus showing up now may mean that there would be related viruses showing up in the future, and thus making a diversity of memory B cells would be quite helpful in recognizing viral variants in the future,” Crotty said.

Ongoing research by his lab into immune memory has implications for broader work in vaccine immunology. Currently, Crotty’s group is also working on candidate HIV vaccines and new vaccine strategies that may apply to many other diseases. **R**

Four NIH Scientists Named to National Academy of Medicine

The National Academy of Medicine (NAM) recently announced election of 100 new members, including four NIH’ers. Election, one of the highest honors in health and medicine, recognizes individuals who have demonstrated outstanding professional achievement and commitment to service.

“This extraordinary class of new members is comprised of exceptional scholars and leaders who have been at the forefront of responding to serious public health challenges, combatting social inequities and achieving innovative discoveries,” said NAM President Dr. Victor Dzau. “Their expertise will be vital to informing the future of health and medicine for the benefit of us all.”

NIH’ers recently elected to NAM and their election citations are:

Dr. Carlos Blanco, director of the Division of Epidemiology, Services and Prevention Research at the National Institute on Drug Abuse. For his pioneering work on the development of treatment and preventive interventions for substance use disorders that has shaped national thinking and guided over \$3 billion in NIH-supported research on the opioid epidemic, justice-involved populations, pain and addiction, cannabis legalization and vaping.



New NAM members are (from l) Dr. Carlos Blanco, Dr. Eugene Koonin, Dr. Bruce Tromberg and Dr. Jennifer Webster-Cyriaque.

Dr. Eugene Koonin, evolutionary genomics group leader and NIH distinguished investigator in the Computational Biology Branch at the National Library of Medicine’s National Center for Biotechnology Information. For his work on the identification of clusters of homologous genes that created the foundation for systematic study of genome evolution and function.

Dr. Bruce Tromberg, director of the National Institute of Biomedical Imaging and Bioengineering. For his leadership in biomedical engineering and the Rapid Acceleration of Diagnostics initiative.

Dr. Jennifer Webster-Cyriaque, deputy director, National Institute of Dental and Craniofacial

Research and chief of the Viral Oral Infections in Immunosuppression and Cancer Laboratory at the National Institute of Allergy and Infectious Diseases. For making seminal contributions to our understanding of the role of virus-host interaction in oral disease.

Established in 1970 as the Institute of Medicine, NAM is an independent organization of eminent professionals from diverse fields including health and medicine; the natural, social and behavioral sciences; and beyond. It serves alongside the National Academy of Sciences and the National Academy of Engineering as an advisor to the nation and the international community.

Fleet

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Federal Sustainability.” The order requires that all federal vehicle acquisitions be electric or zero-emissions vehicles by 2027. Plug-in hybrid models meet these requirements.

NIH owns more than 350 vehicles, said Mark Minnick, chief of the Transportation Management Branch. His branch is responsible for ordering, maintaining and surplus-ing them. Most federal agencies lease their vehicles from the General Services Administration. However, NIH owns its fleet.

“All institutes and centers have to buy vehicles through the branch,” he said. “We make sure that each purchase meets the requirements of executive orders.”

To satisfy the requirement, Minnick said that 20 percent of acquisitions must be zero-emissions vehicles in 2022 and 30 percent of acquisitions must meet the same criteria in 2022. Vehicles that NIH already owns do not have to meet these percentages. This year, 77 percent of vehicles met the criteria, so “we’re ahead of the game.”

The NIH Police Department has already begun the transition to a zero-emission fleet, said Lt. Brian Sims, the fleet’s coordinator. This year, they purchased several plug-in

hybrid Ford Explorers. They’ll continue to add zero-emissions vehicles to replace older cars that age out of service.

“I’ve been an officer since 2003, so I’ve seen the condition of some of the cars,” he said. “We can put our officers in better vehicles and better conditions.”



Mark Minnick

Sims began researching electric models before the executive order. He observed the changing world and saw that automakers were transitioning to electric vehicles. So he wanted to move in that direction.

He found other police departments around the country had been testing Tesla and Ford electric vehicles. Sims reached out to those departments to learn more about their experiences

with electric models. They gave him recommendations and provided cost-benefit analyses.

At the time, he opted against purchasing the electric vehicles because the infrastructure isn’t on campus yet to charge every police vehicle. Additionally, the cars need to be parked in a garage to keep their electronics in optimal condition.

Even though Sims went in a different direction, the experience researching zero-emission models prepared him to comply with the executive order. He now knows how much electric vehicles will cost

and which ones qualify as environmentally responsible.

“We’re going to continue in the green direction, as best as we can,” Sims said. “We plan to order more vehicles and we’ll be getting hybrids. We’re done ordering gas cars.”

Meeting the order’s requirements has been one of the toughest challenges Minnick faced in his almost 34 years at NIH. For more than 20 years, all NIH vehicle acquisitions have been alternative-fuel vehicles. That’s changed overnight, he noted.

Right now, NIH can’t go with a fully electric fleet. There aren’t enough stations for employees who need to keep cars in rotation 24 hours a day. However, charging stations are being installed around campus as new buildings are constructed, Minnick said.

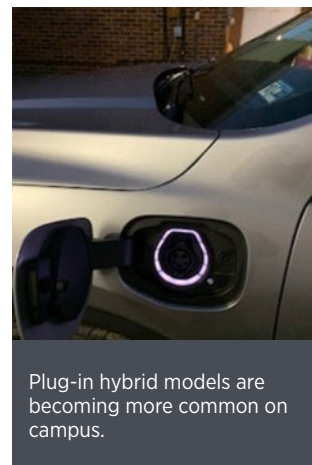
“The biggest problem right now is options,” he said. “Dealers are selling a lot of SUVs and sedans but pick-up trucks make up a majority of our fleets.”

There aren’t many pick ups that meet the order’s requirements.

The few that exist cost a lot of money. He advised institutes and centers who must purchase electric vehicles to hold off on buying trucks until there are more options to reduce the cost.

By 2027, Minnick anticipates there will be a bigger selection of electric models to consider. Ford, Chevrolet and Chrysler are investing in electric vehicle production.

“Hopefully the technology will get better and better, but it’s a huge challenge,” he concluded. **R**



Plug-in hybrid models are becoming more common on campus.



Charging stations such as these are being installed around campus as new buildings are constructed.

FAN Forms at NIH, Marks Year One

On a March afternoon in 2021, Caroline Goon, a principal strategist in NIH's Office of Equity, Diversity and Inclusion (EDI), received a call from Jimmy Do, chief of the Financial Management Branch at the National Institute of Dental and Craniofacial Research.

Do and Goon, who oversees NIH's Asian American, Native Hawaiian and Pacific Islander (AA & NHPI) employment portfolio, were concerned about the uptick in reports of anti-Asian violence. They discussed how to support their AA & NHPI colleagues during this stressful time and what role NIH should play.

Less than a month later, as a result of the conversation, the NIH Federation of Asian American, Native Hawaiian and Pacific Islander Network (FAN) formed—the first time at NIH that all known AA & NHPI employee resource groups (ERGs) came together under one umbrella coalition. Leaders from these ERGs met to address the rise in anti-Asian hate crimes in the United States as a result of the Covid-19 pandemic.

Co-led by Goon and Dr. T. Jake Liang, NIH distinguished investigator at the National Institute of Diabetes and Digestive and Kidney Diseases, FAN currently has more than 80 members from 21 institutes and centers and 10 ERGs across NIH.

FAN's mission is to cultivate an inclusive workplace at NIH where AA & NHPIs feel seen, heard, valued and have equal opportunities to thrive.

One of FAN's recent accomplishments was publishing a research paper examining the AA & NHPI leadership gap and exclusionary environment in the federal workforce. The study, published Sept. 29 in *Frontiers*, is the first peer-reviewed paper written by an NIH-wide coalition representative of the NIH workforce.

A collaboration between EDI and members of FAN, the paper was co-authored by Goon and Tamara Bruce, both of EDI; Janetta Lun, Center for Scientific Review; Gabriel Lai, National Cancer Institute; Serena Chu, National Institute on Mental Health; and Phuong-Tu Le, National Institute on Minority Health and Health Disparities.



NIH's FAN gathers AA & NHPI employee resource groups under one umbrella coalition. Above, FAN members safely get together for an informal networking event over the summer.

The paper shows that AA & NHPIs are clearly underrepresented in senior leadership. In FY2021, AA & NHPIs made up nearly 20% of the NIH permanent employee workforce but only about 6% of senior leadership positions. This disparity may be due to potential hidden biases in the leadership selection process. Furthermore, differences in cultural expectations and characteristics of leadership may prevent AA & NHPIs from pursuing leadership advances.

The study also described the exclusion and invisibility AA & NHPIs often face in their work environment, which may stem from AA & NHPI stereotypes, such as being an outsider and a model minority.

Many employees also recount experiences of ignorant, racist comments. These testimonials, such as the one below, were published in a campaign video on the NIH EDI website during AA & NHPI Heritage Month.

“Based on my name (which is Japanese), people who call me at work assume that I cannot speak English very well. When I answer the phone with my strong American accent, some people hang up after saying that they mistakenly called the wrong number.”—Facing Discrimination: Voices from the AA and NHPI Community, NIH EDI Office

As FAN celebrated its one-year anniversary in 2022, the coalition continues to work to advocate and uplift the AA & NHPI community through its NIH-wide outreach and partnerships.

To learn more about FAN, contact Goon at edi.aapi@mail.nih.gov.

NIEHS-Funded Scientist Talks About Strengthening Tribal Environmental Health

For nearly three decades, Dr. Johnnye Lewis has advanced Native American health by combining basic research, population-level studies, clear science communication and robust partnerships with Tribes.

A longtime NIEHS grant recipient at the University of New Mexico (UNM), she uses a transdisciplinary team approach to tackle issues related to environmental justice and health disparities, which affect many Indigenous communities.

Lewis is a professor in the UNM Community Environmental Health Program, which she launched in 1996 to address Tribal concerns about harmful exposures involving abandoned uranium mines, milling sites and waste piles left from Cold War weapons development. There are more than 1,100 such locations in Navajo Nation, the largest Indigenous reservation. About 170,000 residents live in the territory, which includes parts of Arizona, Utah and New Mexico. Toxic exposures there have been linked to increased risk of cardiovascular disease, diabetes, immune suppression and other conditions.

To expand knowledge about such health threats to Navajo and other Tribes, Lewis directs the UNM Metals Exposure and Toxicity Assessment on Tribal Lands in the Southwest Superfund Research Program Center and the Center for Native American Environmental Health Equity Research, both of which were developed through NIEHS funding. She studies legacy contamination from the uranium mining waste, and that involves assessing complex mixtures of metals, such as uranium, arsenic and lead. Her team also studies emerging exposures, including microplastics, and develops strategies to clean up pollution from the environment.

What motivated her to conduct such research?

"In the early 1990s, I was a consultant for the U.S. Department of Energy on the Uranium Mill Tailings Remedial Action project, which was aimed at cleaning up contamination at thousands of old uranium mill-associated sites," Lewis recalled, in a recent conversation with NIEHS director Dr. Rick Woychik. She interacted with Tribal communities to assess their risk and determine whether there were unique routes of exposure that might occur and add to risk or alter clean-up strategies.

"One day, I was contacted by 20 communities from Navajo Nation that had a history of uranium mining and high prevalence of kidney disease," she said. "What was remarkable was that in their area, such



Dr. Johnnye Lewis directs the UNM Metals Exposure and Toxicity Assessment on Tribal Lands in the Southwest Superfund Research Program Center and the Center for Native American Environmental Health Equity Research. Both were developed through NIEHS funding.

disease occurred very early—at that time, it was not uncommon to see teenagers on dialysis."

A doctor had talked with Tribal members about uranium being a kidney toxicant, Lewis explained, and this had motivated them to seek help conducting research about whether uranium in unregulated water they were drinking was the cause of early onset and severity of kidney disease.

"They had seen one of the early funding opportu-

nity announcements on environmental justice from NIEHS," she continued, "and they brought together a group of people they thought could help. They asked me to lead research in this area, and that's what I've been doing ever since, thanks in large



"One unique aspect of our work is that we listen to communities' concerns and then respond to their needs through research...Our Tribal partners from communities are partners in research design and implementation."

-DR. JOHNNYE LEWIS



part to sustained support from NIEHS. Also, I'm proud that over the years, many of our researchers have been Native American. Their scientific talent, cultural awareness and ability to build trusted partnerships have been vital."

Environmental threats faced by Tribal communities include much more than uranium exposure, however.

"We're not talking about one substance but rather mixtures of toxic metals," Lewis said. "Drinking water contamination due to the metals has been a longstanding issue. And in the decades since the mining and milling sites were in operation, these substances have degraded to nanoparticle size, making them easily moved by wind."

Lewis's team also examines volatile compounds and microplastics associated with burning trash. In some communities, there are no formal solid waste disposal systems, and people burn waste or the Tribes in some cases create very large burn piles that smolder, creating low-temperature combustion over long periods.

"Beyond those potentially harmful inhalation exposures, there are concerns about how such contamination might affect wildlife, livestock, and plant life," Lewis pointed out. "And we worry about what's happening with climate change. We're getting hotter, we're getting drier, and dust storms here are very frequent, increasing risk that pollutants will spread to more areas and affect more people."

Lewis's group works to develop practical, low-cost tools and strategies that can reduce exposure risks and improve health.


"We are currently assessing whether zinc supplementation can prevent DNA damage caused by exposure to arsenic and uranium, which can inhibit DNA repair enzymes," she said. "Preliminary results look very promising and have also taught us a lot about exposures."

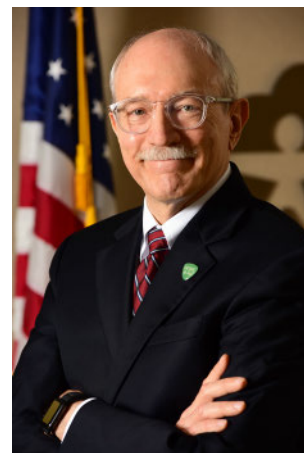
The team also is studying how fungi affect the movement and distribution of metals.

"We're investigating whether manipulation of the soil microbiome can reduce uptake of metals in plants and water, which could benefit ecosystems and agriculture," Lewis explained. "We're doing controlled greenhouse studies to learn how the makeup of fungi in soil affects the movement of these metals. Our goal is to develop a bioreactor, test it in the lab and then take it to a community setting."

Collaboration and partnerships have been crucial to success.

"One unique aspect of our work is that we listen to communities' concerns and then respond to their needs through research," Lewis said.

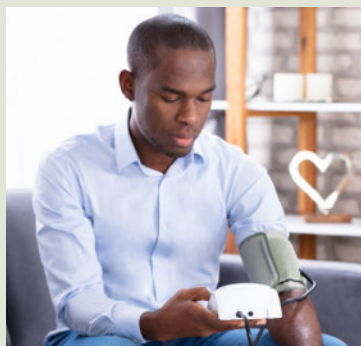
"[For example], some of our investigators were interested in microplastics and then Tribal members raised the issue of burning trash pits, so we knew that expanding in that direction would be a good fit. Our Tribal partners from communities are partners in research design and implementation." 



NIEHS Director Dr. Rick Woychik recently talked with Lewis about her group's work.

PHOTO: STEVE MCCAUGH/NIEHS

NIH-Funded Study Looks at Blood Pressure Trends During Pandemic



During pandemic lockdowns, some people were able to check their blood pressure at home.

PHOTO: ANDREY_POPOV/SHUTTERSTOCK

Adults with hypertension saw a small but consequential rise in their blood pressure levels during the first eight months of the Covid-19 pandemic, while the number of times they had their blood pressure measured dropped significantly. Findings from this NIH-supported study appeared in *Hypertension*.

Hypertension, or high blood pressure, affects more than 1 billion people worldwide. Poor blood pressure control is a risk factor for cardiovascular disease, including heart attack and stroke, as well as a risk factor for more severe Covid-19 disease. Yet only about 1 in 4 U.S. adults with hypertension have their

condition under control, according to CDC data. Widespread stay-at-home orders and lockdowns during the pandemic prompted some researchers to explore its impact on these patients.

In the current NHLBI-funded study, researchers looked at the electronic data records of 137,593 adults with hypertension and compared blood pressure outcomes before the pandemic (August 2018 through January 2020) with those during the peak of the pandemic (April 2020 through January 2021). The data came from three large U.S. health care systems: Cedars-Sinai in Los Angeles, Columbia University Irving Medical Center in New York and Ochsner Health in New Orleans. The average age of the patients was 66 years; 57% were female and 30% were Black.

The researchers discovered first that the number of blood pressure measurements patients had taken declined by as much as 90% in the first three months of the pandemic. While these measurements gradually increased in successive months, the total number of readings at the end of the study period remained below pre-pandemic levels. The researchers attributed this partly to cancellations or postponements of in-person office visits.

The researchers also found the patients' blood pressure rose slightly on average, though studies show such slight increases in blood pressure can raise the risk of major cardiovascular events. Researchers plan to explore the impact of these slight blood pressure increases on long-term cardiovascular health outcomes as well as determine whether some groups may have had difficulty accessing telehealth resources.

"We expected blood pressure control to be worse due to decreased physical activity, stress, poor sleep and other cardiovascular disease risk factors that worsened during the pandemic," said study leader Dr. Hiroshi Gotanda of Cedars-Sinai Medical Center. "But the results were better than we expected, probably because the use of telemedicine and home monitoring of blood pressure."

The successful use of these alternatives to in-person office visits provides a model for improving blood pressure control in future disasters and public health emergencies.

A Personalized Approach to Kidney Disease

Personalized kidney screening for people with type 1 diabetes (T1D) may reduce costs and help detect chronic kidney disease (CKD) earlier, according to a new analysis performed by the Epidemiology of Diabetes Interventions and Complications study group, funded by NIDDK.

The finding, published in *Diabetes Care*, provides the basis for the first evidence-based kidney screening model for people with T1D.

Current CKD screening recommendations include annual urinary albumin excretion rate (AER) testing for anyone who has had T1D for at least five years. Having too much albumin—a protein found in the blood—in urine is a sign of kidney disease. The new findings suggest that AER screening could be personalized to optimize testing frequency and early detection of CKD.

People with T1D have an estimated 50% risk of developing CKD over their lifetime. CKD can progress to kidney failure, requiring dialysis or a kidney transplant. Using more than 30 years of participant data of AER and HbA1c (an integrated measure of blood glucose) from 1,334 participants in two NIDDK-funded clinical trials, the study group identified three levels of CKD risk that were associated with a later CKD diagnosis. They then developed a model to estimate optimal screening intervals.

According to the model's findings, those at highest risk for developing CKD could be screened for urine albumin every six months so, if necessary, appropriate interventions could be instituted as early as possible. Those at lower risk, based on specific AER and blood glucose ranges, could be screened every two years, reducing patient burden and potentially saving millions of dollars compared to annual screening. All others with T1D could continue to be screened annually.

NIDDK studies continue to explore how diabetes affects the body over time and the long-term benefits of early and intensive blood glucose control.

Vaping Linked with Blood Vessel Damage

Electronic cigarettes have become increasingly popular during the past decade as a potentially safer alternative to smoking cigarettes or other tobacco products. But studies suggest that using e-cigarettes, or vaping, also carries health risks.



Vaping may carry health risks.

PHOTO: TIBANNA79/SHUTTERSTOCK

NIH-funded researchers led by Dr. Matthew Springer from the University of California, San Francisco, recently recruited 120 adults, ages 21 to 50, who were in good health, with no known heart problems. Of the 120 volunteers, 42 regularly used e-cigarettes, 28 smoked conventional cigarettes and 50 used neither.

The researchers tested blood samples from all volunteers and used ultrasound to measure blood-vessel function in a subset of people from each group. Results were published in *Arteriosclerosis, Thrombosis and Vascular Biology*.

Testing showed the blood vessels of cigarette smokers and e-cigarette users were less able to expand than the nonsmokers. The team also found signs of impaired blood vessel function when testing their blood serum. Both smokers and e-cigarette users had signs in their blood of increased inflammation and higher risk of blood clots.

In another study published in the same journal issue, the researchers exposed rats to different components of cigarettes and e-cigarettes. These included nicotine, menthol and two gasses found in both products.

Nicotine, the gasses and the inert particles all interfered with blood-vessel function. This suggested that a general response in the body to airway irritation, rather than exposure to any one compound, was driving a drop in blood flow.

"We were surprised to find that there was not a single component that you could remove to stop the damaging effect of smoke or vapors on the blood vessels," Springer says. "As long as there's an irritant in the airway, blood vessel function may be impaired."—adapted from *NIH Research Matters*



Costume contest winners include “Minions” (l and c) from the CC and “Artist Bob Ross” of NIAID.



NIH Hails Halloween Virtually, In Person

Annual Costume Contest Boosts NIH’s CFC Effort

A nurse, an angel and the *Wizard of Oz*’s Dorothy pop onto a Zoom meeting. Sounds like the beginning of a humorous story, but actually it was just the latest installment of NIH’s annual CFC Halloween Charity Fair and Costume Contest. In the end, among a movie-centric field, Gru’s Minions took first prize.

Held virtually and hosted by lead institute NIMHD, the event also featured guest appearances by (people impersonating) *Jurassic Park* paleontologist Alan Grant and *Star Wars*’ Luke Skywalker.



Several charities—Active Minds, 4PAWS Rescue Team, Inc. and the Thomas Gaiter Foundation—sent representatives to describe the positive impact donations can make through the Combined Federal Campaign.

There were 10 entries for the costume contest and winners were announced Nov. 3:

- 1st place. **Minions.** Karina Bridges & Team (CC)
- 2nd place. **Deaf DJ from the *Matrix*.** Kazeem Babatunde (NHLBI)
- 3rd place. **Artist Bob Ross.** Michael Vance (NIAID)

More than 5,000 charities are participating in this year’s campaign and there’s still time to donate. Visit cfc.nih.gov for more information.

Police, Firefighters Drive ‘Trunk or Treat’ at Children’s Inn

Halloween meant “Trunk or Treat” time at the Children’s Inn, as NIH’s Fire Department and Division of Police visited an outdoor costumed affair and brought goodies to share.

Kids and their families explored first responder vehicles and took turns at the wheel.



NIH’s Fire Department and Division of Police visited an outdoor costumed Halloween “Trunk or Treat” gathering at the Children’s Inn. First responder vehicles provided the ultimate trucks for exploration.

INN PHOTOS: CHIA-CHI CHARLIE CHANG

