

MODEL PREDICTIONS

Viboud's Covid Transmission Data Guides Policy

BY DANA TALESNIK

Getting through and beyond an infectious disease pandemic takes a lot of planning. To determine which interventions might have the greatest impact, decision-makers continually rely on data projections. Based on these models, they consider degrees of reopening, vaccination priorities and other strategies to help control transmission, prevent deaths and move toward normalcy.

One of these disease modelers who's busy plugging in the stats and plotting out possible trajectories is Dr. Cécile Viboud, senior staff scientist in FIC's



Dr. Cécile Viboud

Division of International Epidemiology and Population Studies. She spoke virtually to NIH's Covid-19 interest group recently about the virus's transmission and mortality dynamics.

In forecasting trends, there's a lot to learn from other disease outbreaks such as dengue, Ebola and flu, the latter of which is Viboud's focus in non-pandemic times.

"If we're able to predict transmission

rates 3 to 4 weeks ahead, this has some value in terms of situational awareness," she said. But long-term projections are more complicated.

"We have a similar disconnect between weather and climate in the disease world," she explained. "In the same way that weather produces a short-term forecast, we in infectious diseases also are able to relatively accurately predict what's going to happen in the next few weeks. If we think of more long-term projections—similar to climate—it's much more difficult, of course. In the longer term, a lot of things can change," from population behavior to interventions.

There will always be uncertainties that create some outliers during a pandemic, which is why Viboud and fellow epidemiologists turned to ensemble projections from multiple models.

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Take Your Child to [Tele]Work Day reviews are full of Slime.

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Columbia's Bakken Discusses Visualization, Health Equity

BY CARLA GARNETT

Viewers expecting scientific sonnets and iambic pentameter were inspired instead by insights into another art form—nursing research. Columbia University's Dr. Suzanne Bakken discussed "Implications of Poetical Science for Advancing Health Equity through Information Visualization," a recent installment in the National Library of Medicine's Ada Lovelace Lecture Series.

"Division between art and science is



Dr. Suzanne Bakken

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INFORMED DECISIONS

Nutritionists Discuss Dietary Supplements

BY DANA TALESNIK

They're wildly popular and their use is steadily growing. More than half of U.S. adults take one or more dietary supplements,



Carol Haggans

from vitamins to probiotics, omega-3 fish oil to melatonin. Are supplements safe? Do they work? Two NIH nutrition scientists offer some precautions and reminders to help choose and use them wisely.

At this Mar. 16 webinar, fittingly during National Nutrition Month, Carol Haggans and Dr. Paul Thomas,

SEE SUPPLEMENTS, PAGE 8

Bharti To Present Sayer Vision Research Lecture

May 26

Dr. Kapil Bharti, NEI senior investigator and chief of the ocular and stem cell translational research section will virtually deliver the 12th Sayer Vision Research Lecture on Wednesday, May 26 at 11:30 a.m. ET.



Dr. Kapil Bharti

In his talk, “Translating Human Retinal Pigment Epithelium (RPE) Biology into Disease Treatments using Induced Pluripotent Stem Cells,” Bharti will summarize his team’s development of a therapy for age-related macular degeneration (AMD), a leading cause of vision loss in people age 65 and older.

The stem cell-based therapy hinges on Bharti’s technique to produce replacement patches of retinal pigment epithelium (RPE), a monolayer of cells in the back of the eye that maintains the integrity of the light-sensing photoreceptors and that fails in AMD.

Construction of a patch begins with an AMD patient’s blood cells, which are then induced into pluripotent stem cells and then RPE cells. The cells are grown on a biodegradable scaffold to form the patch.

Once the RPE cells are functionally mature, the patch is implanted into the retina using novel surgical tools developed by Bharti’s team. In animal studies the lab-created patch rescued photoreceptors and vision.

In late 2019, Bharti’s team secured approval from the Food and Drug Administration for a phase I/IIa clinical trial testing the safety and feasibility of the patch in AMD patients.

The Sayer Vision Research Lecture Series features prominent scientists conducting vision-related research.

Cohosted by NEI and the Foundation for the National Institutes of Health, the series is supported by the Sayer Vision Research Fund, which was established by NIDDK scientist Dr. Jane M. Sayer to honor her parents, Winthrop and Laura Sayer. The fund incorporates Sayer’s desire to contribute to groundbreaking medical research at NIH while raising the profile of vision research.

Individuals who need reasonable accommodation to participate in this event may email requests to NEInews@nei.nih.gov by May 19.

For information about how to join the event, visit the lecture web page: <https://www.nei.nih.gov/about/news-and-events/past-events/sayer-vision-research-lecture-and-award-series>.

Fauci Donates 3D Model of SARS-CoV-2 to Smithsonian Museum

NIAID director Dr. Anthony Fauci donated his personal 3D model of the SARS-CoV-2 virion to the national medicine and science collections at the Smithsonian’s National Museum of American History.

The donation was presented virtually to the museum’s Elizabeth MacMillan Director Anthea M. Hartig during the Mar. 2 “Great Americans Program” in which Fauci received the museum’s signature honor, the Great Americans medal. As part of the program, philanthropist and Smithsonian Regent David M. Rubenstein interviewed Fauci.



NIAID director Dr. Anthony Fauci recently donated his personal 3D model of the SARS-CoV-2 virion.

IMAGE: SMITHSONIAN NATIONAL MUSEUM OF AMERICAN HISTORY

The “Great Americans” medal is awarded for lifetime contributions embodying American ideas and ideals, and honors individuals who not only have made a lasting impact in their fields, but also whose philanthropic and humanitarian endeavors set them apart.

During the past year, the museum has canvassed the nation asking the public what it should collect to remember and document this pandemic through a digital platform, “Stories of 2020.” For more information, visit: <https://americanhistory.si.edu/story-submission>.

Yale’s Heapy To Lecture on Tech-Based Treatment for Chronic Pain

June 8

Evidence supports behavioral and self-management interventions for people with chronic pain. Widespread implementation and use of these strategies have lagged, however. Technology-based interventions offer one approach to help address the barriers and improve pain-related outcomes. NCCIH is presenting a virtual lecture on this topic within its Integrative Medicine Research Lecture Series.



Dr. Alicia Heapy

On Tuesday, June 8 from noon-1 p.m. ET, Dr. Alicia Heapy will discuss “Cooperative Pain Education and

Self-Management (COPES): A Technology-Assisted Intervention for Pain.”

Heapy is leading research on a nondrug pain management intervention, COPES, in the military health system.

COPES is a technology-based form of cognitive behavioral therapy (CBT) that uses “interactive voice response” and can be accessed by patients remotely and at their preferred times. She will also describe the evidence for COPES’ effectiveness and the relative strengths and weaknesses of technology-assisted and in-person versions of CBT.

Heapy is associate professor of psychiatry at the Yale School of Medicine and associate director of the Pain Research, Informatics, Multimorbidities and Education (PRIME) Center of the VA Connecticut Healthcare System. She also chairs the National Pain Research Working Group.

The lecture will be streamed on NIH VideoCast and Facebook Live. All are welcome. More information is at <https://go.usa.gov/xHpaP>.



Taking on new roles in the NIH Office of the Director are (from l) Dr. Courtney Aklin, John Burklow, Dr. Lyric Jorgenson and Renate Myles.

OD Leadership Shifts Announced

Significant leadership changes within the NIH Office of the Director have occurred. NIH associate deputy director Dr. Tara Schwetz and NIH associate director for



Dr. Tara Schwetz (l) and Dr. Carrie Wolinetz have joined the White House OSTP.

science policy Dr. Carrie Wolinetz, who has also served as acting chief of staff for NIH director Dr. Francis Collins, recently joined the White House Office of Science and Technology Policy (OSTP).



homeland security, health, foreign relations and the environment. OSTP leads efforts across the federal government to develop and implement sound science and technology policies and budgets, and works with the private and philanthropic sectors, state, local, tribal and territorial governments, the research and academic communities and other nations toward this end.

Dr. Courtney Aklin, a senior advisor in Schwetz's immediate office, will serve as acting associate deputy director. Wolinetz's deputy, Dr. Lyric Jorgenson, will step in as acting associate director for science policy.

Associate Director for Communications and Public Liaison John Burklow

will take on a new role, serving as Collins's acting chief of staff. Renate Myles, deputy director for public affairs in the NIH Office of Communications and Public Liaison,

said Collins, announcing the leadership shifts in an email to employees. "I am very proud of both of them. And I have the utmost confidence in Courtney, Lyric, John and Renate in bringing their talents to their new roles." **R**



ON THE COVER: Tick mouth. Image shows how the design of the mouth makes ticks generally difficult to remove once they have attached for a blood meal. A strategic research plan by NIH aims to build on and accelerate new and existing research initiatives to improve scientific understanding of ticks and the pathogens they may transmit, and to develop tools to better diagnose, prevent and treat tickborne illnesses.

IMAGE: NIAID

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“The roles that Tara and Carrie will be filling at OSTP are of great importance to NIH.”

-NIH DIRECTOR DR. FRANCIS COLLINS



Established by Congress in 1976, OSTP advises the President and others within the Executive Office of the President on the scientific, engineering and technological aspects of the economy, national security,

now serves as acting associate director for communications and public liaison.

“The roles that Tara and Carrie will be filling at OSTP are of great importance to NIH and incredible career opportunities,”



Bakken

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artificial,” said Bakken, explaining the concept of poetical science that the series’ namesake developed to emphasize how vital intuition and imaging are in mathematics and science. “I’m using Lovelace’s word ‘intuition,’ although I am more inclined to call it ‘incredibly fast information processing.’ Three key features that we would all recognize as science are observation, interpretation and integration.”

Senior investigator Dr. David Landsman, chief of the Computational Biology Branch in the National Center for Biotechnology Information at NLM, introduced the series. He described Lovelace as the “first computer programmer.”

A daughter of the British peerage who became a visionary mathematician, she discovered that a computer, or “analytical engine,” as such devices had come to be called in those days, could follow a sequence of instructions—a program—to make complex calculations. In addition, Lovelace theorized, the devices could work with things other than numbers.

“She certainly was a very early prophet of the computer age,” Landsman said.

Lovelace, who died at age 36 in 1852, wrote the first algorithm, or series of instruc-



“We can’t just talk to scientists.”

—DR. SUZANNE BAKKEN



tions specifically designed to be followed by a machine.

Landsman said the lecture series “emphasizes NLM’s research focus on computational innovation across biomedical science as a means towards improved health and a better understanding of biology and medicine.”

Bakken, alumni professor of nursing and professor of biomedical informatics at Columbia and director of the NINR-funded Precision in Symptom Self-Management (PriSSM) Center at Columbia’s School of Nursing, had been scheduled to kick off the new series in person last March. Due to Covid safety measures, her lecture was



Bakken said that although her connection to Lovelace may not be immediately obvious—20th century American farm girl versus 19th century British nobility, nurse versus mathematician—there was much common ground between them.

postponed and delivered virtually.

For more than 30 years, Bakken’s research has focused on the intersection of informatics and health equity. NIMH, NCATS, NCI and NLM also have funded her work.

Bakken said that although her connection to Lovelace may not be immediately obvious—20th century American farm girl versus 19th century British nobility, nurse versus mathematician—there was much common ground between them: Both Lovelace and Bakken grew up as bookworms and both as scientists were never satisfied with their own understanding of a topic, no matter how deep that comprehension might seem.

They also shared an acute observational skill that they employed in their research, Bakken pointed out.



Senior investigator Dr. David Landsman of NCBI

Lovelace once observed a Jacquard loom work and its pattern tapestry punch cards, Bakken said. The mathematician then imagined applying similar principles to a device invented by her scientific mentor and colleague, computer pioneer Charles Babbage. “She thought about the analytical machine as the weaving of algebraic equations,” Bakken said.

An NIH grantee since the mid-1990s, Bakken talked about integrating key observations from her own early career as a nurse and nursing science researcher at the University of California, San Francisco. For the last couple of decades, her studies have focused on advancing health equity in urban Latino populations through information visualization.

In her lecture, Bakken emphasized the importance of representing what nurses do in a computable manner, of using information technology as an extension of nursing practice and of involving end-users in design of tools and interventions. She realized the substantial effects within the community she served.

“It was clear that people with low health literacy and poor digital literacy—and many disparities related to what we now call ‘social determinants of health’—are able to access and use digital resources if they have sufficient training,” she said.



Bakken has been an NIH grantee since the mid-1990s.


By the time Bakken reached Columbia and communities in New York City, she was incorporating health literacy and health communication into her research goals.

“I wanted to figure out what every advance practice nurse should know about informatics,” she said, acknowledging the ultra-ambitious goal. How could nurses integrate informatics into their practice and what kind of programs could prepare nurse scientists in interdisciplinary informatics research? “I wanted to build the best program in the world to do that.”

From lessons learned during her community-engaged research projects, Bakken listed four audiences that always should receive results and key messages: scientists, clinicians, research participants and other patients/community members, and policy-makers—local, regional, state and national.

“We can’t just talk to scientists,” she noted.

Summing up, Bakken said her research has confirmed Lovelace’s idea of poetical science and “the importance of intuition and image—including metaphors and analogies—in science...Information visualization is a critical component of health-literate, culturally congruent communication. Effective visual communication can contribute to both downstream and upstream health equity interventions through reducing differences in impact of social, economic and health consequences, vulnerabilities and resources.”

You can view the full lecture at <https://videocast.nih.gov/watch=40070>. 

Cunningham Named NIDCD Scientific Director

Dr. Lisa L. Cunningham was recently named scientific director/director of the Division of Intramural Research at NIDCD. She will oversee the intramural or “in-house” research programs, which have roughly 165 employees working in 13 labs.

“I am delighted that Dr. Cunningham will be joining the NIDCD leadership team as head of our intramural research program,” said NIDCD director Dr. Debara Tucci. “She is passionate about science, and her extensive experience in basic, translational and clinical research will be critical to advancing our shared vision of propelling new discoveries to the clinic and reducing the disease burden in our mission areas.”

Cunningham has been in NIDCD’s intramural program since 2011, becoming chief of the section on sensory biology in 2014. The program focuses on research on human communication disorders, with a primary interest in hearing and balance. The division’s scientists have made great strides in deepening our understanding of inner ear development and function, as well as how genetic variations and factors such as ototoxic drug exposure affect hearing and balance.

“I am honored that Dr. Tucci has entrusted me with this position,” said Cunningham. “The Division of Intramural Research has truly outstanding scientists, and the intellectually rich and collaborative culture of the division has positioned us to make important discoveries and to generate resources that will benefit the entire field. I am looking forward to building on the existing high quality of scientific research by recruiting a diverse faculty of researchers and facilitating the development of innovative therapies.”

Cunningham originally trained as a clinical audiologist and later received her Ph.D. in neuroscience from the University of Virginia. She completed a postdoctoral fellowship at the University of Washington, Seattle, before joining the faculty at the Medical University of South Carolina as an assistant professor.

While she had initially planned for a career as a clinician, an auditory study she conducted as an undergraduate with her classmates serving as research subjects, abruptly changed her path. “We had created a tiny piece of new knowledge and I was hooked. I knew then that research was what I wanted to do for the rest of my life,” said Cunningham.

Her scientific interests lie in the cellular and molecular mechanisms that underlie the survival or death of hair cells—inner ear cells that are fundamental to hearing and balance. An area of particular focus is hearing loss caused by medications, such as certain antibiotics or cancer drugs. She and her team recently found evidence suggesting that a cholesterol-lowering drug called atorvastatin can reduce hearing loss in patients undergoing cancer chemotherapy with cisplatin, which is toxic to hair cells. Her team is pursuing this finding through a phase 3 trial—the first phase 3 trial to be conducted within the division.

Among Cunningham’s numerous honors and awards are two NIDCD Director’s Awards and an NIH Bench-to-Bedside Award. She has also been recognized for her commitment to mentoring, having been voted 3 times one of the top 10 teachers in the Medical University of South Carolina College of Graduate Studies, and having received a NIH Graduate Partnerships Program Outstanding Mentor Award.

Cunningham has been an active member of the scientific community, both within and outside NIH. As academic dean of the NIH Oxford-Cambridge Scholars Program, she has helped to advance NIH on the world stage and to launch the biomedical research careers of a group of talented graduate students. She has also served as an elected member of the Association for Research in Otolaryngology, where she has worked on diversity programming and cultural awareness. In her role in the association, she has helped to create a framework for ensuring that the field as a whole is inclusive, diverse and welcoming.



Dr. Lisa L. Cunningham

Viboud

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Impact of Interventions

In spring 2020, Viboud and colleagues set out to project the Covid outbreak over 6 months in a small, rural U.S. county to guide its reopening strategy. Her group helped coordinate projections from 17 academic teams who were tasked with modeling infections, hospitalizations and deaths and the probability of a new outbreak from May to November based on different interventions—from stay-at-home orders to reopening workplaces at different intervals.

Some clear, obvious results came from every model: health outcomes would improve by remaining closed; relaxing restrictions too soon would cause a surge in cases and hospitalizations.

Interestingly, when comparing ensemble projections across the models with what actually happened in 66 U.S. counties of similar size that remained closed through Aug. 31, Viboud said, “the model data really aligns well at the 6-month timescale with observations.”

Vaccine Scenarios

The project was extended to look at the next 6 months, based on 4 vaccine scenarios designed by the CDC and then President-elect Joe Biden’s transition team. A collaboration among NIH and Penn State and Johns Hopkins universities, first-round projections were released on Jan. 6.



Viboud and colleagues set out to project the Covid outbreak over 6 months in a small, rural U.S. county to guide its reopening strategy.

The scenarios were:

- **Optimistic**—a fast rollout of 25 million doses per month of highly effective vaccines, with nonpharmaceutical interventions (NPI)—such as distancing, testing, contact tracing—remaining high for 6 weeks then slowly tapering off
- **Moderate**—a slower vaccine rollout of lower efficacy vaccines with a faster decline in NPI starting at 3 weeks

- **Fatigue**—a slower vaccine rollout of high-efficacy vaccines but, due to hesitancy, only half the population accepts it

- **Counterfactual**—no vaccine along with a fast NPI decline

As expected, the models all show a modest, steady case decline in the optimistic scenario, while the other three predict a resurgence in cases before declining. All six models show the U.S. in a better place by July 1, with hospitalizations and deaths decreasing. The question is how bad it gets before it gets better.

“In vaccine scenarios, we see a faster decrease in hospitalizations and deaths than we see in cases

and that’s because of the vaccination scheme that’s targeting high-risk groups before the general population,” said Viboud.

• • •
“In vaccine scenarios, we see a faster decrease in hospitalizations and deaths than we see in cases.”
• • •

—DR. CÉCILE VIBOUD

The optimistic, best-case scenario predicts upwards of 600,000 U.S. deaths by June 2021. But the most realistic trajectory back in January was a combination of the moderate

and fatigue scenarios. Currently, models are getting tweaked to evaluate new-variant scenarios—a more-contagious U.K. variant and a South African one that seems to evade natural immunity.

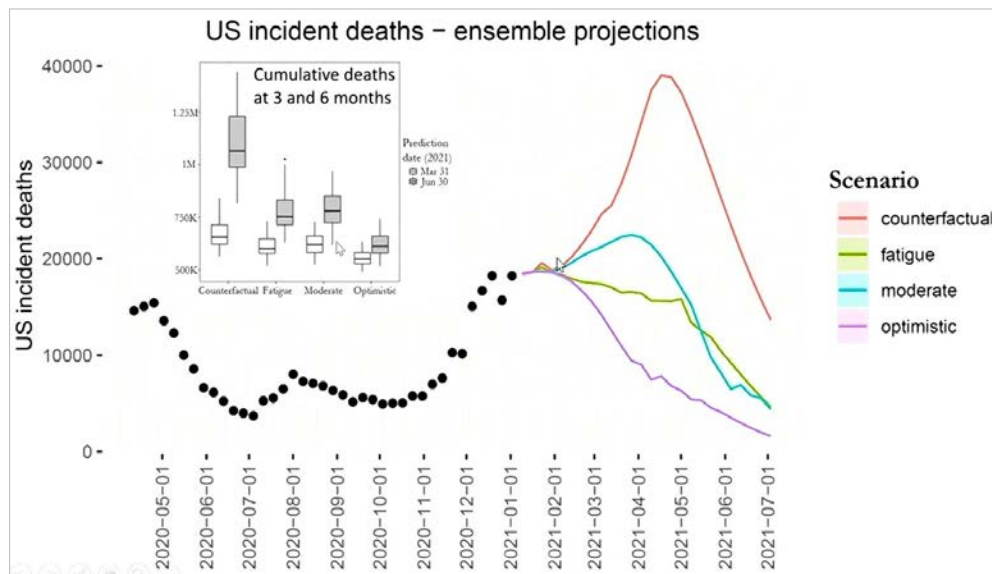
Mortality Patterns

One way to quantify the burden of infection during a pandemic is to look at excess mortality: that is, taking mortality data from previous years, in normal times, and attributing deaths exceeding that baseline to the pandemic.

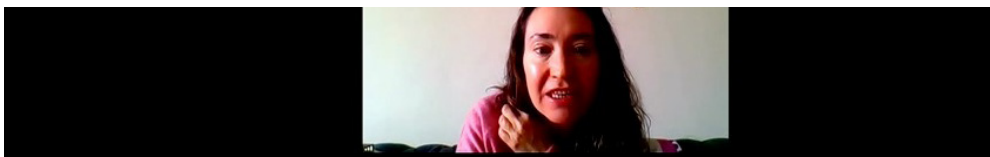
The most specific indicator of Covid’s impact is excess respiratory deaths, which have matched closely with official Covid-19 mortality statistics. There’s also a high correlation between excess burden of Covid and high rates of certain diseases.

“This suggests that maybe Covid has a direct impact on diabetes, heart disease and cerebrovascular disease,” Viboud said.

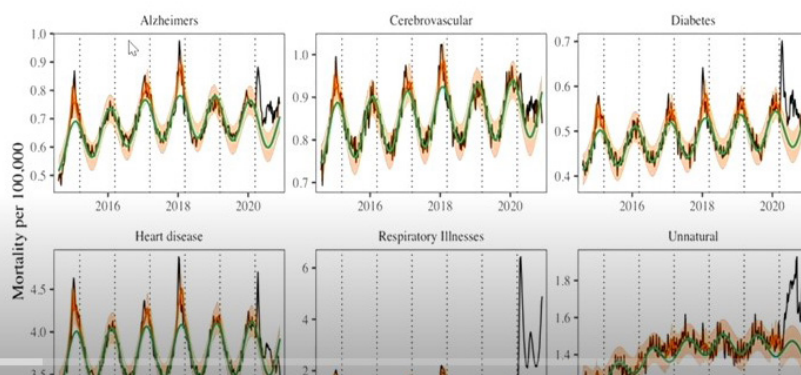
In the U.S., 82 percent of all-cause excess



Back in January, Viboud projected the fatigue and moderate scenarios as most realistic in the coming months. The accelerated pace of vaccinations has shifted projections toward optimistic.



Excess mortality models and impact of the COVID-19 pandemic on different causes of deaths



Viboud illustrates the three-wave pattern of Covid's impact on six major causes of death. The difference between the black and orange lines represents excess mortality in the pandemic months of 2020.

deaths are confirmed as Covid-19 fatalities, a rate that's been stable since summer 2020, she said. Of the remaining 18 percent, at least 8 percent are indirect increases in unnatural causes, such as injuries, suicides or drug overdoses, and secondary impacts that did not follow the Covid trajectory.

"What's quite striking is the number of excess deaths in young individuals [ages 25-44] that's not directly attributed to Covid-19," she said.

Overall, compared with flu pandemics, as of Nov. 30, the excess Covid death rate was 6 times that of a severe flu season and 24 times greater than the 2009 flu pandemic.

Going Global

Also critical to Viboud's research is looking at global data and the outcomes of pandemic-related policy decisions in other countries.

With contacts in China, her team is looking at the impact of social distancing in Shanghai and whether tracking population mobility through digital contact tracing sufficiently interrupted viral transmission without the burdens of lockdown.

Viboud's long-term collaboration on influenza with South Africa's National Institutes of Communicable Diseases has extended to studying Covid hospitalization

trends. A small serology survey last summer in Capetown found a high Covid attack rate across all age groups that captured infection up to the first peak. Viboud's South African colleagues thought they were out of the woods, but the country experienced a second wave, spurred by the new Covid variant.

"If you want to quantify the burden of a pandemic, you have to quantify the total—all of the positive and negative impacts," Viboud emphasized.

Among the positives are the pandemic health measures, from hygiene to masking, that have decreased the circulation of other pathogens. It's a major reason why, for example, in South Africa last year, hospitals saw far fewer children with respiratory illnesses than in previous years.

Among negative impacts are the effects of averting the health care system and therefore not getting tested and treated for new and existing conditions.

"One question," said Viboud, "is whether those illnesses are going to be unattended and show up as deaths later on." **B**

NICHD's Zimmerberg Honored for Contributions to Membrane Research

Dr. Joshua Zimmerberg, chief of NICHD's section on integrative biophysics, has been named the 2021 recipient of the Sir Bernard Katz Award for

Excellence in Research on Membrane Fusion, Fission and Traffic. Given by the Biophysical Society, the award is named for the 1970 co-recipient of the Nobel Prize in Medicine or Physiology, who discovered that neurotransmitters are released from membrane-bound vesicles and travel across synapses to relay messages between neurons.



Dr. Joshua Zimmerberg

Zimmerberg was recognized for his contribution to the understanding of how cell membranes fuse together and separate in exocytosis, the process by which membrane-bound vesicles release from the cell, and endocytosis, the process by which membranes envelop materials to take them into the cell.

During his career, Zimmerberg's discoveries have led to insights into how viruses enter cells, how the toxoplasma parasite invades cells, and how malaria parasites enter cells, commandeer resources, evade the immune system and progress through the various stages of their life cycles.

Food Trucks Return to Campus

Food trucks have returned to serve staff on the Bethesda main campus in the 10H parking lot. Weather permitting, the trucks will operate daily from 11 a.m. to 2 p.m., or until the food runs out. The trucks are sponsored by the Division of Amenities and Transportation Services, Office of Research Services.

Continued operation of the food trucks will depend upon demand by the NIH community. A full list of food trucks and menus can be found on the R&W website at <https://govemployee.com/nih/food-trucks/>. Bookmark <https://www.ors.od.nih.gov/food> for full details and to stay updated on all the offerings.

Be sure to wear facial covering, maintain physical distancing while waiting in line or receiving food and remember safe distancing while enjoying your lunch. Direct comments and concerns to the Food Services Team at (301) 827-3248 or ORSWEPB@ors.od.nih.gov.

Supplements

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registered dietitians and science and health consultants in OD's Office of Dietary Supplements (ODS), took turns doling out tips about vitamins, minerals and herbal supplements, also known as botanicals. The event was one of several ODS has planned to celebrate its 25th anniversary.

Supplements are a booming business. "Americans spend more on supplements than they do on over-the-counter medications," said Thomas, who noted that supplement use increases with age. More than three-quarters of people in their 70s and older take them.

And there's no shortage of options. More than 80,000 products with hundreds of ingredients, individually or in combination, are out there, with no product registry. Many people take vitamins and minerals to supplement their diet; others take botanicals for their claims of an immunity boost, weight loss, soothing to sleep or preventing disease onset. Thomas urged caution.

"People who supplement tend to do it on their own without the help, advice or even knowledge of their health care providers," he said. "And that's not a good thing."



Haggans noted that "supplements can't take the place of a healthy diet, because foods contain other nutrients including dietary fiber and other substances that promote health."

In many cases, people get sufficient vitamins and minerals from food and may not even need nutritional supplements.

"It's important to remember," said Haggans, "supplements can't take the place of a healthy diet, because foods contain other nutrients including dietary fiber and other substances that promote health."



Dr. Paul Thomas said, "Americans spend more on supplements than they do on over-the-counter medications."

But people with nutrient deficiencies may opt to take them. Many adults over 50, for example, have trouble absorbing vitamin B12 from food. Vegans also may choose to supplement B12, zinc, iron and other nutrients found mainly in animal products.

Remember, noted Haggans, recommended dietary allowances (RDAs) include nutrients from foods, fortified foods and supplements, so don't overdo it. Going beyond the upper limit of certain vitamins and minerals can be toxic. And some supplements can interact with certain medications—another reason to discuss supplement use with a doctor.

What about multivitamins? One-third of adults take them, but formulations differ, said Haggans. "There's no definition of what constitutes a multivitamin in terms of how many ingredients they contain, which ones

and at what doses, so it's up to the manufacturer." Check product labels to see what they contain.

Herbal supplements, on the other hand, don't have daily values of intake, warned Thomas. "So you need expert advice on when and if to take the product, and the recommended dosing," he said.

"Just because botanical herbal supplements come from plants, don't think that products labeled natural are automatically good and safe for you."

Botanicals can vary greatly in composition. In fact, "for most botanicals, we don't know what constituents are the most important, or what combination provides the potential health benefits," said Thomas, "so the manufacturer often makes an educated guess."

Some botanicals, like nutritional supplements, can either reduce or increase the potency of medications. And some come in concentrated forms that can be toxic if taken in excess.

Manufacturers often include the word "standardized" on the label, but that doesn't indicate safety or effectiveness. It only helps to confirm the botanical is chemically consistent between batches.

The Food and Drug Administration does regulate supplements, classifying them as foods, not as drugs. This designation prohibits manufacturers from making disease claims about the supplement. "But there's a fine line for what's allowed and what isn't," warned Haggans, and many people may incorrectly interpret the claims.

Good manufacturing practices are mandated, but the FDA does not pre-approve supplements for safety or effectiveness—except in the rare case of a new ingredient. There are also no mandatory formulation or dosing standards. Look for third-party seals, such as from the U.S. Pharmacopeia, NSF International and ConsumerLab.com, which are some of the independent organizations that verify the product was properly formulated and manufactured. However, these seals don't guarantee safety or efficacy.

So do your homework, Haggans and Thomas advised. ODS has fact sheets on supplements for consumers and health professionals as well as a label database of more than 76,000 products. See <https://ods.od.nih.gov/>.

"The best advice we can give you is to talk with your health care providers before taking any supplements," said Thomas. "Have a discussion with your doctor, pharmacist, registered dietitian or other provider about whether these products, and which ones, might be useful, or useless, to you."

To view the videocast on-demand, see: <https://videocast.nih.gov/watch=41643>.

Singleton To Direct New Intramural Effort for Dementia Research

Dr. Andrew B. Singleton is the director of a new NIH intramural research effort, the Center for Alzheimer's and Related Dementias (CARD). He has been serving as CARD acting director since its construction plan launch in January 2020. He is set to stimulate and lead collaborative research group projects to expand knowledge of the biological mechanisms of Alzheimer's and related dementias, and to explore methods of treatment and prevention.



Dr. Andrew Singleton

"With his decades of experience leading cutting-edge neurodegenerative disease research, Andy is uniquely qualified to inspire and facilitate a collaborative network of multidisciplinary scientists to realize the CARD mission of initiating, stimulating, accelerating and supporting research in Alzheimer's and related dementias," said NIA director Dr. Richard Hodes. "I am confident that through his leadership, NIH will continue to make significant advancement toward the development of effective treatments and prevention strategies for these devastating diseases."

NIA and NINDS established CARD in 2020 and the plan is to open a dedicated laboratory facility on the NIH main campus in early 2022. Researchers will have opportunities to capitalize on unique NIH resources, including the Clinical Center for conducting early-phase clinical trials, and NCATS for high-throughput testing capabilities.

Alzheimer's is the most common diagnosis for dementia. Experts estimate that as many as 5.8 million Americans 65 and older in 2020 have Alzheimer's disease dementia, and the prevalence in the United States is projected to increase to 13.8 million by 2050.

As CARD director, Singleton will lead its scientific and administrative oversight to advance basic, translational and clinical research for Alzheimer's and related dementias, and collaborate with researchers

across the nation and around the world.

"Our immediate priorities will be to quickly stand up our clinical, translational and basic research efforts," he said. "Critical to this effort will be the recruitment of key positions within CARD, including leadership of translational and clinical areas. It is essential that we train and recruit the very best and brightest scientists with an emphasis on creating a diverse and energetic culture."

Singleton credits the NIH Intramural Research Program for providing, through its unique abilities, opportunities and incredible wealth of talent, the foundation for this new center. He joined NIH's NIA IRP in 2001 and became a principal investigator leading its molecular genetics unit the following year.

In 2007, he became an NIA tenured senior investigator. In 2008, he was named chief of the NIA Laboratory of Neurogenetics. His lab has worked over the last two decades on the genetic causes and contributors to neurodegenerative diseases. Researchers have identified causes and risk factors in Alzheimer's disease, frontotemporal dementia, Parkinson's, dementia with Lewy

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"Our immediate priorities will be to quickly stand up our clinical, translational and basic research efforts."

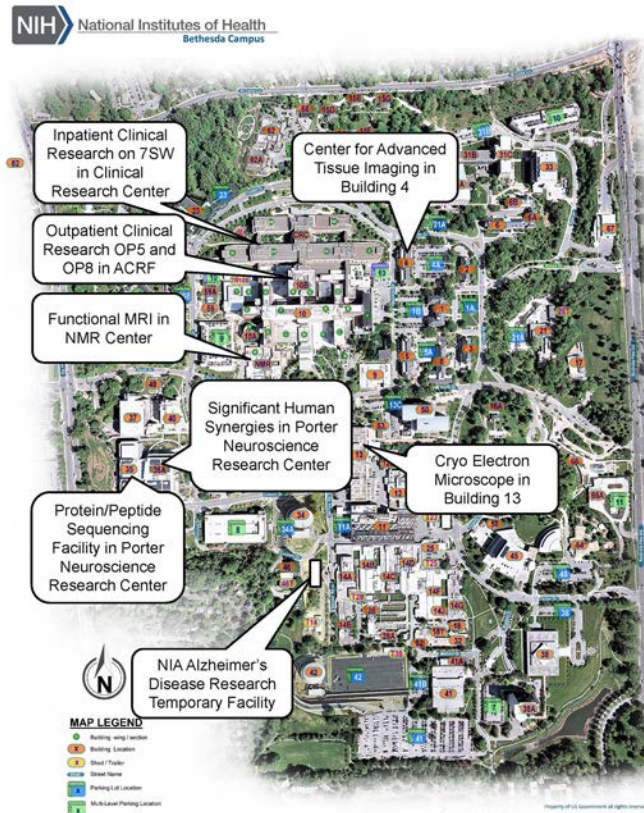
-DR. ANDREW SINGLETON

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 bodies, motor neuron diseases and rare progressive neurological disorders.

Singleton currently serves on the scientific advisory board of the Lewy Body Dementia Association and is a member of the editorial boards of *Neurodegenerative Diseases*, *Neurobiology of Disease*, *Neurogenetics*, *Movement Disorders* (associate editor), *Lancet Neurology*, *Journal of Parkinson's Disease*, *NPJ Parkinson's Disease* (associate editor) and the *Journal of Huntington's Disease*.

Examples of his many other honors are the 2019 Robert A. Pritzker Award for Leadership in Parkinson's Research, 2017 American Academy of Neurology Movement Disorders Award and NIH Director's Awards in 2008 and 2016.

Singleton earned his Ph.D. from the University of Newcastle upon Tyne, United Kingdom, and his B.Sc. from the University of Sunderland, U.K.



At left, Bethesda Master Plan (minimum of 10 years): 1) construct Bldg. N7, 2) demolish existing Bldg. 12, 3) construct Bldg. N12, 4) relocate NIA staff to N12, 5) disassemble temporary facility; at right, synergies between NIA Alzheimer's disease temporary research facility and Bethesda campus resources

Aragon Appointed NIGMS Division Director

BY SUSAN ATHEY

Dr. Richard Aragon is the new director of the NIGMS Division of Data Integration, Modeling and Analytics (DIMA). He had been DIMA acting director since January 2020.

DIMA is NIGMS's central nexus for data-driven discussions, decisions and actions. The division provides the institute with robust data and information that aid in efficient administration of all NIGMS programs and in proper stewardship of taxpayer resources.

"DIMA provides expert analysis and evaluation of NIGMS programs, leads our institute's strategic planning activities and coordinates responses to requests for information from Congress, NIH leadership and the administration," said NIGMS director Dr. Jon Lorsch. "As we set to embark on the launch of the NIGMS 2021-2025 Strategic Plan this spring, Richard's extensive expertise in spearheading these activities makes him the ideal candidate to lead this critical component of the institute."

Aragon joined NIGMS in 2014 as chief of what was then the Office of Program Planning, Analysis and Evaluation. In this role, he evolved and expanded the office's capabilities to include predictive analytics, budget and fiscal modeling, and the use of artificial intelligence to enhance business processes. He also oversaw the publication of the previous NIGMS strategic plan.

Prior to NIGMS, Aragon held two positions in the Office of the Assistant Secretary

for Financial Resources within the Office of the HHS Secretary: directing the Division of Program Integrity Assessment, Integration and Oversight and the Division of Outreach, Communications and Training. As part of these roles, he established HHS's enterprise risk management capabilities.

Before his positions at HHS, he was a program director in the Office of Technology and Industrial Relations at the National Cancer Institute.

"I look forward to working with my colleagues to ensure that DIMA becomes the leading center and model of data and operational excellence at NIGMS and NIH, both for the scientific community and the many other communities and individuals we are privileged to serve," said Aragon.

Aragon earned a Ph.D. in biochemistry and molecular biology

from George Washington University Medical Center and conducted postdoctoral research at Georgetown University's Lombardi Comprehensive Cancer Center. He is the recipient of numerous HHS and NIH awards, including the NIH Director's Award, NIH Merit Award and HHS Deputy Secretary's Certificate of Excellence for his role in the successful rollout and functional integration of the Re-Imagine HHS initiatives.

Berkson Named Director of NICHD Office

Laura Berkson has been named director of NICHD's Office of Legislation, Public Policy and Ethics. The office supports the institute's functions related to legislative analysis, liaison with stakeholder



Laura Berkson

organizations and societies, institute partnerships, and controlled correspondence. It also manages NICHD's ethics and committee management programs.

Berkson joins NICHD from the NIH Office of Legislative Policy and Analysis, where she has been a senior legislative analyst since 2014.

In that capacity, she served as a liaison to Congress, providing information to legislators' offices on NIH research and programs, analyzing pending legislation and preparing the NIH director for hearings and meetings with members of Congress. She began her NIH career in 2012 as a presidential management fellow and completed rotations at NICHD and the U.S. House of Representatives' committee on energy and commerce.

Berkson received her bachelor of arts degree in health: science, society and policy from Brandeis University. She went on to earn her juris doctor degree from Hofstra University School of Law, where she was a health law and policy fellow. **R**

International Teams Explore Genetic Effects of Chernobyl

In two landmark studies, researchers have used cutting-edge genomic tools to investigate the potential health effects of exposure to ionizing radiation, a known carcinogen, from the 1986 accident at the Chernobyl nuclear power plant in northern Ukraine.



Researchers have used DNA sequencing to study the effects of radiation from the Chernobyl nuclear accident on human health

IMAGE: NCI/ISTOCK

One study found no evidence that radiation exposure to parents resulted in new genetic changes being passed from parent to child. The second study documented the genetic changes in the tumors of people who developed thyroid cancer after being exposed as children or fetuses to the radiation released by the accident.

The findings, published around the 35th anniversary of the disaster, come from international teams of investigators led by NCI researchers. The studies were published online in *Science*.

The new research uses DNA sequencing and other genomic characterization tools to analyze biospecimens from people affected by the disaster.

In the first study, researchers analyzed the complete genomes of 130 people born between 1987 and 2002 and their 105 mother-father pairs. One or both parents had worked at, or lived close to, the Chernobyl plant. Analyzing the genomes of adult children, researchers found no evidence of an increase in the number or types of de novo mutations—genetic changes transmitted to offspring but not observed in the parents—in their children born between 46 weeks and 15 years after the accident. The findings suggest that the ionizing radiation exposure from the accident had a minimal, if any, impact on the health of the subsequent generation.

“We view these results as very reassuring for people who were living in Fukushima [Japan] at the time of the [nuclear] accident in 2011,” said Dr. Stephen Chanock, director, NCI’s Division of Cancer Epidemiology and Genetics (DCEG). “The radiation doses in Japan are known to have been lower than those recorded at Chernobyl.”

In the second study, researchers sequenced the

genetic changes in thyroid cancers that developed in 359 people exposed as children or *in utero* to ionizing radiation from radioactive iodine (I-131) released by the Chernobyl reactor and in 81 unexposed individuals born more than 9 months after the accident.

Researchers identified the key genes in which alterations enabled the cancers to grow and survive. Nearly all the alterations involved genes in the same signaling pathway. They also identified the types of early genetic changes following exposure to radiation that enabled the growth of thyroid cancers.

The study was made possible by the creation of the Chernobyl Tissue Bank about two decades ago, long before the technology existed to conduct genomic and molecular studies.

Dr. Lindsay M. Morton, deputy chief of the Radiation Epidemiology Branch in DCEG who led the study, said “[Our colleagues in Ukraine] recognized there would be substantial advances in technology in the future, and the research community is now benefiting from their foresight.”

Lack of Sleep May Increase Dementia Risk

Short sleep duration during midlife could increase the risk of developing dementia later in life, an NIA study suggests. The results appeared online in *Nature Communications*.

In prior studies, both insufficient and excessive



A 30-year study explores the links between sleep deficits and dementia.

PHOTO: TAB1962/ISTOCK/GETTY

sleep have been linked to greater risk of developing dementia. Yet it’s been hard to determine whether these sleep changes contribute to the disease or simply reflect early symptoms. Many of the studies on sleep and dementia risk have followed participants for less than a decade and focused on people older than 65.

In the new study, researchers analyzed data from nearly 8,000 people in Britain starting at age 50. Participants reported how many hours they slept at night between 1985 and 2016, and some of the participants wore accelerometers to measure sleep time. Over the course of the 30-year study, 521 participants received a dementia diagnosis at an average age of 77.

Analysis of the data showed that people in their

50s and 60s who got 6 hours of sleep or less were at increased risk of developing dementia later. Compared to those getting 7 hours of sleep, people getting less rest each night were 30 percent more likely to be diagnosed with dementia.

Further research is needed to confirm this connection and understand the underlying reasons. The findings, though, underscore the importance of good sleep habits, which play an important role in learning, memory, mood and overall health.— adapted from *NIH Research Matters*

NIH Establishes New Network to Study Childhood Asthma

NIAID has awarded \$10 million in first-year funding to establish a clinical research network called

Childhood Asthma in Urban Settings (CAUSE). This nationwide network will conduct observational studies and clinical trials to improve understanding

of asthma and develop treatment and prevention approaches tailored to children of low-income families living in urban communities. NIAID intends to provide approximately \$70 million over 7 years to support the CAUSE network.

This new initiative expands NIAID’s longstanding efforts to reduce the disproportionate burden of asthma among children living in low-income urban environments. Since 1991, NIAID has sponsored a series of research programs in urban areas where pediatric asthma is prevalent and severe.

NIAID-funded research found that exposure to cockroach allergen is a major risk factor for severe asthma in urban children and that programs to decrease exposures to cockroaches and other household allergens reduce children’s asthma symptoms and health care visits. Researchers also established that omalizumab, a drug that reduces immunoglobulin E, can prevent seasonal asthma attacks.

CAUSE investigators will study the mechanisms that contribute to asthma development and severity and develop new strategies to mitigate the impact of asthma among disadvantaged youth. The CAUSE network, which will conduct locally relevant clinical trials, comprises a leadership center at the University of Wisconsin-Madison and seven clinical research centers across the country.



PHOTO: JUAN MONINO/GETTY



Kennedy Graves. “Thank you for this much-needed escape from virtual learning! I am Carmen Graves, NIAID/Vaccine Research Center, Clinical Trials Program. My 10-year-old daughter Kennedy thoroughly enjoyed ‘Slime Time’ and is presently in a virtual scavenger hunt! You guys did an awesome job, especially during these trying times. We truly appreciate everything!”

Take Your Child to Work Day, a Virtual Hit



NIGMS Ambassadors. From Twitter: “The @ArkanSono team is very proud of our STEM Ambassadors who presented two virtual outreach sessions as part of the NIH/NIGMS ‘Take Your Child To Work Day!’ Congrats high school students Julio, Fardeen and Insherah and incoming med student James!” Below, a shot of the “Are You Moving Fast Enough?” session underway.



Adelaide Soper, grade 3, a week before her 9th birthday, enjoys extracting DNA from strawberries in her kitchen, during one of OD’s activities.—parent Sabrina Springer, NLM technical information specialist



Dia Gautam, grade 3, attends “Create Your Own Neuron.” “She loved all the six sessions she attended today. Great arrangements even during this unprecedented time.”—parent Dr. Rajeev Gautam, Program Officer, Virology Branch, DMID/NIAID/NIH



Above, **Matthew Brown,** 2nd grade, made slime at the FAES Science Fair and created his own neuron model. “We had a great time!”—parent Dr. Larissa Brown of NCBI. At left, **Grand Time.** “My three granddaughters Celeste (6th grade), Bitsy (3rd grade) and Esme (K—She wanted to tag along) are shown extracting DNA from strawberries. They also participated intently in a Zoom event, ‘How Concepts of Evolution and Math Can Tame the Next Pandemic.’”—Dr. David Cassatt, NIAID program officer. Below, **Yoga Giggles.** NIH director Dr. Francis Collins and OITE director Dr. Sharon Milgram enjoy some “Laughter Yoga,” led by instructor Alexa Drubay, during an OD event.



Isaac (6) and Gabriella (3) Taliaferro extract DNA from strawberries—parent Dr. Lanyn Perez Taliaferro, program officer, NIAID/Radiation & Nuclear Medical Countermeasures Program

