

'WITH SCIENCE AND SPEED'

At NIH, President Announces Winter Strategy vs. Pandemic

BY CARLA GARNETT

With winter approaching and a new Covid-19 variant—omicron—identified just days previously in the U.S., President Joe Biden made his second visit this year to NIH on Dec. 2 to discuss the nation's new strategy against the pandemic.

"The actions I'm announcing are ones that all Americans can rally behind and should unite us in the fight against Covid-19," Biden said. "[The measures] come from a position of strength. We are better positioned than we were a year ago...[We have to] put the divisiveness behind us and unite with a common purpose—think of it as a patriotic



NIH director Dr. Francis Collins (l) greets President Joe Biden, who visited NIH Dec. 2 to announce plans to handle Covid-19 over winter.

PHOTO: CHIA-CHI CHARLIE CHANG

responsibility. [This plan] doesn't include shutdowns or lockdowns, but widespread vaccinations and boosters, testing and a lot more...

"This new variant is cause for concern, not panic," Biden emphasized. "We have the

SEE **PRESIDENT**, PAGE 3

'BEST JOB IN BIOMEDICAL RESEARCH'

Collins Reflects on 12+ Years as NIH Director

A lot has changed at NIH and in the world since the mid-August day in 2009, when Dr. Francis Collins addressed a Natcher Bldg. audience on his first day as NIH director.

For the past nearly 2 years, of course, NIH and the rest of the globe have been thrust into a historic coronavirus pandemic that has taken the lives of more than 5.1 million people and dramatically shifted how humans interact with each other. The period has presented both enormous challenges and tremendous opportunities for the world's largest funder of medical research, and for the organization's leader.

Perhaps most surprising then is what has not changed since day one: Collins's enthusiasm and energy for the job. On Dec. 19, he'll step down after more than 12 years in

SEE **COLLINS**, PAGE 6

50 YEARS LATER

Impact of 1971's National Cancer Act Marked

BY NIZIA ALAM

This year marks the 50th anniversary of the passage of the National Cancer Act of 1971 (NCA), the landmark legislation that catalyzed breakthroughs in cancer research and care and improved the lives of the American people.

"The NCA advanced NIH's mission to improve the public's health through scientific discovery," said NCI director Dr. Ned Sharpless. "The programs and advances enabled by the legislation accelerated improvements in cancer prevention, early detection and treatment over the decades that have dramatically reduced the burden of cancer in our country and far beyond."

By 1970, cancer was the second leading cause of death in the U.S. and the number one health concern of the American people.

SEE **CANCER ACT**, PAGE 4



Pandemic volunteers give and get vaccinations.

NIAMS Staffers Look Back on Pandemic Volunteer Efforts

BY STEPHANIE A. MATHEWS

In January 2020, news of a novel coronavirus spreading through China caught the world's attention and we watched as cases emerged across the globe. Most of us did not expect that, 2 months later, we would face rapidly increasing infection rates and a lockdown that would make 2020 a year we won't soon forget.

Covid-19 hit the NIH campus on Mar.

SEE **VOLUNTEERS**, PAGE 10



Young patient performs, gives thanks. See p. 12

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NIAMS scientific director Dr. John O'Shea performs at the Newseum. He'll give the Paul Lecture on Dec. 15.

PHOTO: RON GERMAIN

O'Shea To Deliver Paul Lecture, Dec. 15

NIAMS scientific director Dr. John O'Shea will deliver the annual William E. Paul Lecture, part of the Wednesday Afternoon Lecture Series, on Dec. 15 at 3 p.m. via <https://videocast.nih.gov/watch=43816>. The title of his talk is "Cytokine Signaling: The More Things Change, the More They Stay the Same."

The annual Paul lecture, started in 2016, honors the legacy of Dr. William Paul, past chief of the NIAID Laboratory of Immunology and leader of NIH's immunology community, whose career was without parallel in the field of immunology. Paul died in 2015.

O'Shea, a resident local-boy-done-good, is best known for his work on cytokines, which are small proteins important in cell signaling. A substantial portion of cytokines bind to receptors that associate with a class of protein tyrosine kinases, termed Janus kinases or Jaks.

O'Shea and his colleagues cloned the tyrosine kinase Jak3 and demonstrated its role in pathogenesis of severe combined immunodeficiency, including rheumatoid arthritis. This, in turn, has led to the development of a new class of immunomodulatory drugs.

O'Shea joined the NIH as a fellow in NIAID in 1981 and started his own lab group in NCI in 1989 before moving to NIAMS in 1994 as chief of the Lymphocyte cell biology section. He became chief of the NIAMS Molecular Immunology and Inflammation Branch in 2002. He worked with Paul as a fellow and as a collaborator for many years.

"I'm very honored to give the Bill Paul lecture," O'Shea said. "Bill was such an inspirational individual—a great scientist, a great person and always so supportive of me as I was trying to make my way being a scientist. He was truly an extraordinary role model."

A member of the National Academy of Medicine, O'Shea is the recipient of numerous awards, including the 2021 Harrington Prize for Innovation in Medicine (with fellow NIH'er Warren Leonard, NHLBI), PHS Physician Researcher of the Year,

Lee C. Howley Sr. Prize for Arthritis Scientific Research and the AAI-Steinman Award for Human Immunology Research.

Continuing Medical Education credits will be available for the lecture.

Zhou To Give Next ODS Webinar, Dec. 17

The Office of Disease Prevention will present a Methods: Mind the Gap webinar with Dr. Xin Zhou on the use of power calculation for stepped wedge designs. This webinar will take place on Friday, Dec. 17 at 1 p.m. ET.



Dr. Xin Zhou

The stepped wedge design is increasingly popular in a wide variety of settings, including public health intervention evaluations, clinical and health service research. Zhou will introduce two new methods, using maximum likelihood and

generalized estimating equations, to improve the power calculation for binary outcomes.

Zhou is an assistant professor in the department of biostatistics at the Yale School of Public Health. He received his Ph.D. in biostatistics from the University of North Carolina at Chapel Hill. Prior to arriving at Yale, Zhou was a postdoc fellow at Harvard T.H. Chan School of Public Health. His research focuses on cluster randomized trials, measurement error correction, and statistical and machine learning methods in precision medicine.

Registration for the webinar is required at prevention.nih.gov/education-training/methods-mind-gap/power-calculations-stepped-wedge-designs-binary-outcomes-methods-and-software. The session will be recorded and available on the ODP website within approximately 1 week.

For more information, visit prevention.nih.gov/MindTheGap.

Donate Use-or-Lose Hours to Leave Bank

In 2020, NIH employees lost an estimated \$4.1 million in annual leave. Don't lose yours. The Leave Bank offers the opportunity to put that leave to use by donating it by Jan. 1 via ITAS. When you donate to the Leave Bank, you help a co-worker in need, like this recipient:

"Words cannot express my gratitude for the leave bank. My son has a very serious (and terminal) illness, resulting in many hospital stays, as well as multiple surgeries. Knowing that the leave bank is available gives me the peace of mind to know that remaining in pay status is something that I no longer have to worry about and that I can put all my attention and care where it should be, with my son. From our family to yours, thank you for helping us through this very difficult time."

To donate, log in at <https://itas.nih.gov>. On the tool bar, select "Donate to Leave Bank." Find more information at <https://hr.nih.gov/leavebank>. For questions, call (301) 443-8393 or email LeaveBank@od.nih.gov.

UNITE Portrait Project Installed

A UNITE art installation project was officially unveiled during an onsite walk-through with NIH leadership on Nov. 19.

The project focuses on diversifying art within NIH buildings and digital spaces. The artwork is meant to highlight the diversity of NIH staff and reflect the diversity of our nation in order to promote a sense of inclusivity and belonging. The effort additionally aims to enhance NIH recruitment and retention efforts.

The first phase of portraits will be installed in Bldgs. 1, 10 and 31 on the Bethesda main campus. The new interior design concept and artwork were crafted by the NIH Medical Arts Branch, which was recently recognized with the 2021 Graphic Design USA Health and Wellness Design Award.

Details about UNITE activities can be found at <https://www.nih.gov/ending-structural-racism/unite>.



At left, viewing the new art are (from l) project lead Dr. Sadhana Jackson, NIH director Dr. Francis Collins and UNITE co-chairs—Dr. Alfred Johnson, Dr. Marie Bernard and Dr. Lawrence Tabak. At right, Jackson holds her own portrait before its installation in Bldg. 10. A virtual tour of the exhibition is also planned.

PHOTOS: CHIA-CHI CHARLIE CHANG

President

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best tools, the best vaccines, the best medicines and the best scientists in the world. We're going to fight [omicron] with science and speed, not chaos and confusion."

The president's strategy—developed with combined advice from some of the nation's top physicians, scientists and public health experts—employs five key actions:

- Expand the nationwide booster campaign with more outreach, appointments, hours and sites to walk in for shots for up to 110 million Americans who are eligible for boosters

- Launch new family vaccination clinics "to make it easier for children, parents and whole families to get vaccinated in one place, and new policies to keep our children in school instead of quarantining at home"

- Make free, at-home Covid-19 tests more widely accessible and covered by private health insurance

- Increase to 60 the number of surge response teams (physicians, nurses and other health care workers trained in providing emergency medical care) that are deployed to communities with rising caseloads and overwhelmed hospitals

- Speed up efforts to vaccinate the rest of the world

"We will accelerate the delivery of more vaccines to countries that need it," Biden said. "[The U.S. pledges] 200 million more doses in the next 100 days, on our way to



Before Biden (r) took the stage, he met briefly with agency leaders (from r) NIH director Dr. Francis Collins, principal deputy director Dr. Lawrence Tabak, NIAID director Dr. Anthony Fauci and Vaccine Research Center deputy director and chief medical officer Dr. Julie Ledgerwood (l).



The President announces five actions he plans to fight Covid-19 and its variants over winter.

PHOTOS: CHIA-CHI CHARLIE CHANG

delivering more than 1.2 million doses for the rest of the world. Let me be clear. Not a single vaccine dose that America sends to the rest of the world will ever come at the expense of any American. I'll always make sure that our people are protected first."

Before the President took the stage in Natcher's Ruth Kirschstein Auditorium, agency leaders—including NIH director Dr. Francis Collins, principal deputy director Dr. Lawrence Tabak, NIAID director Dr. Anthony Fauci and Vaccine Research Center deputy director and chief medical officer Dr. Julie Ledgerwood—briefed him on how viral mutations occur and why vaccines and boosters are important as the virus that causes Covid-19 continues to mutate into new variants, like omicron.

Biden also took a moment to thank

Collins, "one of the most important scientists of our times...He's done an incredible job. He recently announced he's going to step down as director of NIH this month after a truly consequential tenure.

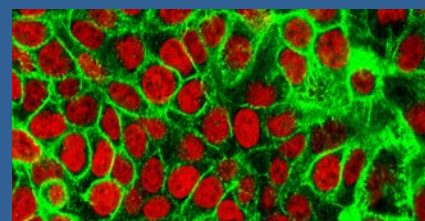
"He's an incredible resource for our nation," Biden continued. "I mean this sincerely—I'm grateful for everything he's done for this pandemic and in advancing all kinds of medical breakthroughs, including mapping the human genome...The good news for us is that he's returning to the lab

at [the National Human Genome Research Institute] and we look forward to his unmatched ability to unlock possibilities that are within our reach.

"The bad news for you, Doc, is, you ain't getting rid of me, man!" the President joked to Collins who sat in the front row during the remarks. "I'm going to keep calling you all the time, because there's a lot of other things you can help me get done."

The President ended his visit with thanks on behalf of the country.

"God bless our doctors, our scientists and all of you here at NIH, for what you're doing for the country and quite frankly, for the world," Biden concluded. "You're the best, the very, very best." **R**



ON THE COVER: Human colon cancer cells with the cell nuclei stained red and the protein E-cadherin stained green. E-cadherin is a cell adhesion molecule and its loss signals a process known as the epithelial-mesenchymal transition in which cells acquire the ability to migrate and become invasive. Dec. 23, 2021, marks the 50th anniversary of the landmark National Cancer Act.

IMAGE: NCI CENTER FOR CANCER RESEARCH

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NIH National Institutes of Health
Turning Discovery Into Health



President Richard Nixon signs the National Cancer Act on December 23, 1971.

PHOTO: NATIONAL CANCER INSTITUTE

Cancer Act

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Recognizing public anxiety and the need for more funding for cancer research, Mary Lasker and other advocates pushed for legislation that would substantially increase the country's commitment to making advances against the deadly disease.

On Dec. 23, 1971, President Richard Nixon signed NCA into law, providing NCI with expanded authorities and responsibilities through development of a National Cancer Program.

One of the most forward-thinking concepts to emerge was the modern-day NCI Cancer Centers Program, an anchor of the nation's cancer research effort. NCA initially directed NCI to establish 15 new research facilities. There are now 71 NCI-Designated Cancer Centers in 36 states and the District of Columbia. They perform cutting-edge research and conduct practice-changing clinical trials, and many deliver state-of-the-art treatment throughout the nation, including in a number of underserved communities.

NCA also established the foundation for a nationwide cancer clinical trials program. Many trials under this network helped establish standards of care and produced numerous treatment advances. Now known as the National Clinical Trials Network, the program encompasses trials at more than 2,200 sites internationally. Recent analysis found that over 40 years, findings from the clinical trials network have added 14 million years of life for people in the U.S.

NCI's commitment that all people benefit from clinical trials also led to the creation, in 2014, of the NCI Community Oncology Research Program (NCORP). Through

NCORP, more people, particularly those from underserved populations, have access to clinical trials and innovative studies of ways to prevent cancer and manage the short- and long-term effects of cancer and its treatments.

Another vital mandate of NCA was collection, analysis and dissemination of data that can provide insights into the state of cancer prevention, diagnosis and treatment. That directive prompted establishment of SEER (Surveillance, Epidemiology and End Results) in 1973.

SEER now covers 48 percent of the nation's population, including 22 different geographic areas, and collects data on approximately 800,000 new cancer cases (without any personally identifying information) each year.

Recent SEER expansions focused on areas that include more people from underserved and ethnic/racial groups. Data from SEER allows researchers to perform population-based studies that identify new trends in cancer incidence. More recently, pilot studies were launched that link SEER

data with information from commercial insurers to better understand trends in use of specific cancer drugs.

The NCA's passage half a century ago has contributed to the consistent decline in the overall cancer death rate in the U.S., which has gone down 31 percent since its peak in 1991. A key contributor to that decline is progress in cancer prevention, including the HPV vaccine, comprehensive tobacco control programs that have slashed smoking rates, and effective screening options for colorectal and breast cancers.

Cancer treatment has also radically transformed. Although surgery, chemotherapy and radiation therapy are still mainstays of cancer treatment, therapies that target tumors with specific genetic alterations and immunotherapy, which unleashes a patient's immune system on their cancers, are now standard treatments for a growing number of cancers.

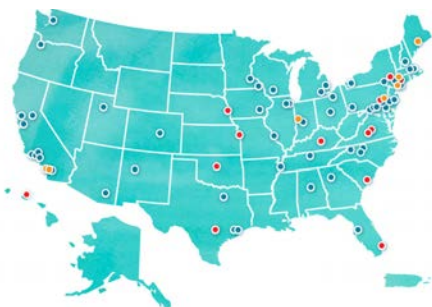
NCA also opened the door to collaboration between other biomedical research fields, including a rich cross-fertilization between cancer and HIV/AIDS research. In 1981—just 10 years after the NCA was signed—the Clinical Center admitted one of the first patients with what would come to be known as AIDS. NCI's expertise in retrovirology, immunology and drug development uniquely positioned the institute to make early advances in the fight against HIV/AIDS and AIDS-associated cancer. NCI scientists co-discovered HIV, showed that it was the cause of AIDS, developed the first blood test to prevent the spread of HIV by blood transfusion, and developed the first effective drugs to treat HIV, including azidothymidine (also called AZT or zidovudine).

Another unique aspect of the NCA was its



In March 1972, advocate Mary Lasker (7th from l) participated in the first-ever meeting of the National Cancer advisory board, which was formed in the wake of NCA to advise the NCI director on activities of the National Cancer Program. Lasker played a vital role in making NCA a reality.

PHOTO: NATIONAL LIBRARY OF MEDICINE



Thanks to NCA, what started as a network of 15 cancer care centers has now grown to 71 NCI-designated centers in 36 states and the District of Columbia.

IMAGE: NATIONAL CANCER INSTITUTE

mandate to establish two advisory groups: the National Cancer Advisory Board, a presidentially appointed panel of research experts and advocates that provides guidance to NCI leadership, and the President's Cancer Panel, which reviews the National Cancer Program and submits an annual report on specific topics of importance (e.g., HPV vaccine uptake, clinical trials enrollment) to the President. Additionally, NCA made the NCI director a presidential appointee.

"The essence of the [NCA] was to provide not only more resources for cancer research, which it did, but also some protection from the bureaucratic processes that tend to envelop special initiatives," explained Dr. Vincent T. DeVita, Jr., former NCI director (1980-1988). "[The protection came with] special authorities to allow the institute to operate with greater speed and flexibility, and special reporting lines to troubleshoot problems that might arise."

As the NCA signing anniversary nears, NCI is committed to President Biden's goal to "end cancer as we know it." By building on 50 years of progress, advancing health equity, personalizing cancer care, embracing technological innovation, inspiring the next generation of diverse researchers and preparing for the challenges of the future, NCI believes it can reach this goal.

"I believe it's within our power to deliver on President Biden's call to action to end cancer as we know it," said Sharpless. "And nothing will stop us from reaching that goal."

Who are the people behind 50 years of progress in cancer research and care? Learn their stories at www.cancer.gov/news-events/nca50?cid=wL_ext_en_nihrecord_nca50. **R**

NIH Updates Policy Manual on Harassment, Discrimination

The NIH Policy Manual Chapter on Preventing and Addressing Harassment and Inappropriate Conduct has been updated to reflect the recommendations of the UNITE initiative.

When the agency first strengthened its policies on preventing and addressing harassment and inappropriate conduct and centralized the reporting and inquiry process through the NIH Office of Human Resource's Civil Branch in 2018, many employees mistakenly thought the policy referred only to sexual harassment.

Members of the initiative believed some employees who were experiencing harassment may not identify themselves with the policy. The update makes clear that all types of harassment—not just sexual harassment—are covered under the policy, said Jessica Hawkins, Civil Branch chief.

The revised policy defines what groups are protected from harassment-based employment discrimination. Protected classes include race, color, religion, sex (including pregnancy, gender identity, transgender status and sexual orientation), national origin, age (40 years or older), disability and genetic information.

The update also explains the steps contractors must take if they want to report harassment or inappropriate conduct. They are encouraged to first discuss concerns with their contracting company and/or the contracting officer's representative, and then follow their company's reporting requirements. Contractors may also report their concerns to Civil.

Finally, the revised policy explains the differences between two processes—the Civil process and Equal Employment Opportunity (EEO) complaints through the Office of Equity, Diversity, and Inclusion.

"People have often come to our office confused about their protections and which office to go to for which type of issues that they've faced within the workforce," said Treava Hopkins-Laboy, EDI acting director. "The updated manual chapter clearly identifies the options available for employees who feel they've been subjected to harassment discrimination or just inappropriate behavior."

Civil receives allegations of inappropriate conduct, including all forms of harassment, and oversees the appropriate administrative review or inquiry in an objective and consistent manner across NIH. Civil's goal is to stop any inappropriate or harassing behaviors immediately and to ensure that appropriate corrective action is taken in a timely manner.

PROTECTED GROUPS DEFINED

"Anyone can report inappropriate behavior; it doesn't need to meet the legal definition of harassment," said Hawkins.

This is separate and distinct from the EEO complaint process.

An EEO complaint may be filed by a current or former employee or an applicant for employment who alleges discrimination based on [being a member of] a legally protected class. EDI's complaint processing provides for informal counseling, investigation, adjudication and potential resolution of EEO complaints.

Employees must contact EDI within 45 days of the discriminatory incident to file a pre-complaint of discrimination, or within 45 days of when they become aware that they have been discriminated against. Reporting an incident to Civil does not start the 45-day process.

Staff who want to file an EEO complaint must contact EDI separately to ensure they submit their claim within the 45-day timeframe. Contacting Civil will not stop, pause, or alter the timeframe available to employees to contact EDI for filing an EEO complaint.

NIH managers and supervisors should review the updated policy closely to understand fully their obligation to report allegations of harassment to Civil as soon as possible and to cooperate fully in a review of the concerns.

"Managers and supervisors play a major role in the process," said Hawkins. "While Civil centralizes fact finding, managers and supervisors are still the one with the authority to take action and address concerns."

Managers and supervisors are also responsible for ensuring their staff are aware of this policy and know where they can learn more about Civil's process. Importantly, managers and supervisors must not discourage staff from, or reprimand staff for, reporting allegations.

"The manual is just one piece of the puzzle to create a more inclusive workplace," said Hopkins-Laboy.

The complete list of revisions can be found on the Civil website at <https://hr.nih.gov/working-nih/civil/nih-manual-chapter-1311-summary-2021-updates>.

The policy manual chapter can be found at <https://policymanual.nih.gov/1311>.



NIH director Dr. Francis Collins (r) rocks on guitar with ARRA at a 2016 Camp Fantastic barbecue on the CC's south lawn. Later this month, Collins ends his tenure as director, a role in which he happily wore many hats at once—physician-scientist, medical research ambassador and musician-in-chief.

PHOTO: ERNIE BRANSON

Collins

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the agency's top seat, in part to make way for fresh leadership. Collins recently reflected on the mark his tenure leaves.

Master Communicator

Over his career, the longest serving presidentially appointed NIH director has gained a reputation as an accomplished science communicator. His ability to translate not only oftentimes gnarly concepts of medical research, but also the promise and hope of scientific enterprise in general, is tough to overstate. Collins attributed some of his ease with public speaking to his childhood.

"My father was a theatrical director and producer [and] my mother was a playwright, and I ended up onstage at an early age and loved that," he recalled. He performed in a small 200-seat theater, which was beneficial because "you could see your audience and you knew if you were connecting or not."

This experience first came in handy when he was a faculty member at the University of Michigan. "One of my big tasks was teaching medical students, and, if you want to be humbled by your own communication deficiencies, this is a great way to discover them," he laughed. "They will turn you off really quickly if you're not making sense on their level."

Flexibility is also important in communication, he added. Ask yourself, "Am I coming across here or do I need to modify the approach a little bit?"

He hearkened back to his theater audience-reading experience when speaking at in-person events, where he can gauge engagement and understanding in real time. It's still possible in virtual settings, he added, though much harder to read body language through a screen.

The pandemic experience has reaffirmed the importance of science communication. While it's a big part of his job as NIH director, communication is also "an important part of what all scientists are called upon to do," Collins declared.

"You need to be prepared at all times to describe your research in ways that anyone could understand, and you need to be aware whether the information you're sharing is getting across."



At a 2011 U2 concert with several CC patients, Collins (l) and a youngster try out Edge's guitar.

PHOTO: DIANE BAKER



Collins always made meetings with members of Congress a top priority. Above left, he bumps elbows with Sen. Chris Van Hollen (D-MD) earlier this year outside the VRC. PHOTO: CHIA-CHI CHARLIE CHANG At right, Collins shares a laugh with then-Sen. Barbara Mikulski (c) during a 2013 visit with NINDS's Dr. Daniel Reich (r) and NIA's Dr. Susan Resnick (l) in the Nuclear Medicine Research Facility. PHOTO: ERNIE BRANSON

In more public communication, Collins tries to consider the background of an audience and often formulates analogies based on that. "I always try to imagine... how [to] put forward what might be a complicated scientific concept in a way that would resonate," he shared.

Flexibility is also important in communi-



Collins has built relationships with Capitol Hill lawmakers, including Sen. Roy Blunt (R-MO), seen here on an NIH tour in 2017.

Rocking the House

Collins also frequently communicates through music, performing solo and with colleagues.

"For me, music lifts my spirits," he said. "It's good therapy and it's an enjoyable way to share an experience with others."

Collins spread the joy of music throughout the agency, playing piano for patients at the Clinical Center and rocking on guitar with his band, the Affordable Rock 'n' Roll Act (ARRA), at NIH events. Sometimes he'd write his own lyrics and serenade staff, students or conference attendees with such memorable originals as *Amazing DNA* to the tune of *Runaway*.

"When the band is really in the groove—with an audience who may be listening, or better yet dancing—and you're up there on the stage with your scientific colleagues making a song just rock the house, that's pretty special," he said. "A lot of internal dopamine gets delivered at that moment."

And speaking of how music affects the brain: "I do think there's a lot we can learn about how music touches us in ways that can





In 2012, Collins and then-HHS Secretary Kathleen Sebelius joined with leaders of several pharmaceutical partners to announce the first of many therapeutic discovery programs led by the newly established NCATS.

PHOTO: ERNIE BRANSON

be uplifting and even healing,” said Collins, who, along with opera soprano Renée Fleming, has been a driving force behind NIH’s Sound Health initiative. Now in its fifth year, Sound Health unites neuroscientists with music therapists to study how music affects the brain and develop music-based therapies for neurological disorders.

“I think there’s a lot of promise there, and I love the idea of bridging what’s often seen as a gap between the humanities and the sciences,” he said. “Maybe as a guy who grew up in a theatrical family that also valued music a lot, this is for me an opportunity to bring together the various parts of who I am. And this clearly taps into similar hopes and dreams of a lot of other NIH scientists” who have enthusiastically joined the effort.

During the pandemic, Collins said he missed having live band gigs but made time to play and sing solo “just to try to change the dynamic a little bit of a very intense and busy day.”

Progress Report

The Collins era began with an outline of five priority areas he wanted to tackle: high-throughput technologies; translation of NIH science into practice; employing science to benefit health care reform; global health; and reinvigorating the biomedical research community through stable funding increases, high-quality training and diversity.

“In each of those areas, some real progress got made,” he said. “Much of this progress has been greatly aided in the last 6 years by

Congress coming around to an enthusiastic support of our need for sustainable, predictable increases in budgets, which has made it possible to start new projects.”

Collins pointed to advances in the technology arena—the BRAIN Initiative, stem cells and single-cell biology—and making sure developments in basic science successfully move into clinical benefits for patients.

“A big step was the creation of a new entity at NIH,” he said. “NCATS was a big push for me in the first couple of years as NIH director, to have a dedicated part of NIH that was focused on translational science. NCATS has been remarkably successful in that space.”

Collins wanted to make even further inroads in that area sooner.

“That’s one reason we’re now pushing forward this new concept of ARPA-H—a new division of NIH that could do even more about the gap between a scientific opportunity and it being turned into reality in a way that is going to benefit clinical practice,” he said.

In global health research, Collins talked about H3 Africa (human heredity and health in Africa), which “has supported dozens of institutions in 30 African countries, all working together in a network that has made it possible for a lot of cutting-edge science to emerge [across the continent]. There was a real risk of losing a lot of African talent because of the absence of opportunities.”

Another area where Collins had wanted to make much more headway is “diversity of our workforce, grantee community, and clinical trials participants...We recognized

going back many years that we had work to do in this space. It’s been clear that the biomedical research community does not look, in terms of the diversity of the participants, like the country.”

NIH has made considerable strides intramurally through the Distinguished Scholars Program, Collins noted. Just beginning is the first extramural program also aiming to do cohort recruitment of tenure-track faculty with specific interests in diversity.

More comprehensively, NIH under Collins’s leadership has initiated a bold and unprecedented program through the UNITE initiative, aiming to address the long-standing problems of structural racism—both in terms of the workforce and how NIH’s health disparities research portfolio has been shaped.

Top Successes, Within and Outside

Asked what he sees as top accomplishments for NIH under his watch, Collins noted, for intramural research: clinical applications in cutting-edge genomic strategies for sickle cell disease “resulting in not just improvements in status, but what appears to be genuine cures; cancer immunotherapy efforts making it increasingly clear that activating the immune system can provide responses to cancer, even for people with stage 4 disease”; and securing funding from Congress after many years for the Clinical Center’s new surgery-radiology laboratory medicine wing.

But when history looks back at this era, he says, there will no doubt be much note taken of how the scientists in the NIH Vaccine Research Center were able to develop a Covid-19 vaccine in record time, and saved hundreds of thousands of lives.

Among extramural successes, Collins pointed to the BRAIN Initiative, “because this is a remarkable interdisciplinary effort to try to figure out how that really complicated structure called the human brain does what it does...In terms of basic science frontiers, it’s hard to go much deeper into the area of the unknown than the human brain. And we’re determined to sort that out.”

Collins also pointed to the “All of Us” program, which is recruiting a million Americans as NIH partners in a detailed study of factors that play out in health or illness.



Collins (second from r) in 2012, announcing the first leadership team of NIH’s new entity—NCATS

PHOTO: MICHAEL SPENCER

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Collins served under three presidents. Above, he accompanies then-HHS Secretary Sebelius and the man who appointed him in 2009, President Barack Obama (r), on a short tour of the CRC.

PHOTOS: ERNIE BRANSON

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“This is going to be a foundation for discoveries for decades to come,” he predicted. “This will be one of the things over the course of the next 20 years or so that people will look at and go, ‘Wow, that really made a difference.’”

From One Director to the Next

After he was nominated as NIH director by President Obama, Collins spoke with Dr. Elias Zerhouni, who held the position previously. Zerhouni told Collins not to forget the “next generation of scientific talent.” Back then, budget cuts resulting from the country’s Great Recession were putting serious stress on higher education.

“[Zerhouni] was deeply worried we were in such a discouraging place for young investigators that we were going to lose a whole cohort of that group, never to return,” Collins said. “I heard that loud and clear.”

Collins launched the Next Generation Researchers Initiative, which supports early-stage investigators through specific funding and evaluation efforts. Before NextGen, the agency funded 600 grants from



Former NIH director Dr. Elias Zerhouni (l) offered words of wisdom to the man who succeeded him as head of NIH. Collins recalled the advice throughout his tenure, and as he leaves the job.

first-time applicants who were within 10 years of their highest degree. Over the past 3 years, NIH has funded more than 1,100 grants from the same applicant pool.

“Elias also talked about whether we were doing enough to build on the scientific capabilities that occur in the private sector,” Collins recounted. “That inspired me to think a bit more about

what could be done.”

One result was the Accelerating Medicines Partnership, a public-private partnership that brings together top scientists from government, academia and industry to determine which research areas would benefit most from collaboration.

“AMP has emerged as a really powerful collaborative effort that just didn’t exist before,” Collins said.

Projects on Alzheimer’s disease, diabetes, rheumatoid arthritis, schizophrenia and Parkinson’s disease emerged. Recently, a new endeavor, the Bespoke Gene Therapy Consortium, was launched to speed development of gene therapies for the 30 million Americans who suffer from a rare disease.

If NIH’s next director asks him, Collins won’t hesitate to recommend another top priority: Build relationships with Capitol Hill lawmakers.

“Never turn down an invitation to meet with a member of Congress—even if you’re really busy,” he advised.

Despite Congress’s reputation for partisanship, he said, most members value biomedical research. In a dozen years, Collins estimated he’s had more than 1,000 one-on-one meetings with elected officials.

“These meetings almost always go well,” he explained. “Elected officials see what a remarkably important contribution NIH makes to finding answers to those health conditions that they’re worried about on behalf of themselves or their families or their constituents.”

Over the past 6 years, NIH’s budget has grown significantly. “That has a lot to do with the heroes in Congress,” he noted.

Peering into the Future

Research can take us in unexpected directions. Looking back, Collins never

anticipated CRISPR gene editing would play such a dominant role during his tenure as director.

“Therapeutically, I’m really excited about where we’re going with gene therapy, that we might get to a point where those 7,000 genetic diseases where you know the DNA misspelling could actually be approached in a systematic way,” he said. “We’re starting to see some hope for that.”

Collins cited neuroscience as another field full of potential. “Along with that, I hope we’ll make major progress in dealing with the drug overdose crisis and the need to find better answers to chronic pain.

“And I’ve got to talk about vaccines,” said Collins, calling mRNA vaccines an amazing advance with potential beyond Covid-19. “mRNA opens up all these possibilities about how you might use these approaches [in other ways], like cancer. That’s going to be a big area we’ll want to invest in.”

Collins is also excited about the great strides in single-cell biology, “which has just transformed our ability to understand how life works and how disease happens.”

Anyone employing Collins’s practice of reading body language can see the obvious. Just thinking about the scientific potential ahead, the NIH director can hardly contain the infectious enthusiasm and energy that have become his signature. In a week or so, he moves away from the top post and returns full time to his firsthand research pursuits.

“I will tell you that [stepping down] was a tough decision,” Collins concluded. “I love the NIH. And this job is probably the best job in biomedical research, in terms of what one can do to shape research investments that are going to change people’s lives.

“Going through these 2 years with Covid, and seeing how the scientific community has risen to this challenge with things like the ACTIV partnership and the RADx initiative, as well as everything else that’s come out of NIH scientific commitments, has just been breathtaking. It’s also pretty exhausting, of course. The decision to step away was not an easy one. But 12 years is a long time to be in this position, longer than any previous presidentially appointed NIH director. And it’s a good thing for scientific organizations to have a turnover in leadership. After 12 years, it’s time for that.”

Eric Bock, Carla Garnett, Amber Snyder and Dana Talesnik contributed to this article. **R**

Das Appointed NIMHD Division Director

Dr. Rina Das has been named director of the Division of Integrative Biological and Behavioral Sciences (IBBS) at the National Institute on Minority Health and Health



Dr. Rina Das

Disparities.

Since joining the institute in 2014 as a program director, Das has made major contributions to NIMHD's extramural scientific programs and received many awards for her scientific leadership and collaborative

efforts. She lends her expertise to a wide array of initiatives that seek to improve minority health and health disparities, including translational sciences, cancer health disparities, social epigenomics, liver disease disparities, sleep health disparities and immigrant health.

At NIMHD Das initiated a new program on social epigenomics to integrate two different fields of social and biological sciences that has resulted in many funded applications, not only at NIMHD but also across NIH. She also launched the Immigrant Health Initiative to improve understanding of the factors for health advantages and health disparities among immigrant populations, and to develop interventions to address those gaps. In addition, she has led efforts to increase diversity in the biomedical workforce through numerous programs throughout NIMHD and NIH.

Prior to joining NIMHD, Das served as a program director at NCI's Center to Reduce Cancer Health Disparities and as an NHLBI scientific review officer.

Das earned her Ph.D. in biochemistry from Jawaharlal Nehru University in New Delhi, India, in 1987. Her postdoctoral training in cancer research took place in the intramural labs at the National Cancer Institute, where she focused on the relationship between genes, hormones and breast cancer.

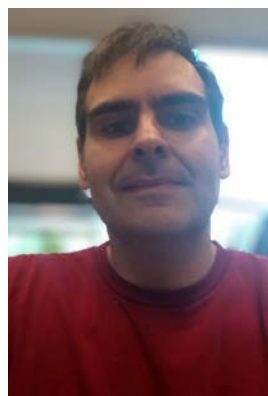
NCATS's Michael Recognized as 'Champion of Change'

NCATS CIO Sam Michael recently was recognized with a Service to the Citizen: Champions of Change Award for his leadership in the National Covid Cohort Collaborative (N3C) initiative.

N3C is a data resource that systematically collects data from electronic health records from different institutions and harmonizes the data into a centralized tool available for clinicians and researchers to study Covid-19. The data will help them better understand the disease, design clinical studies, identify potential treatments and more. For example, researchers are using N3C data to better understand why some people experience long-term Covid symptoms, the effects of Covid-19 on infant and maternal health, and outcomes in Covid-19 patients with chronic conditions.

N3C is a collection of close to 100 research institutions and thousands of users supported by cloud-based computer networks. Michael helped design the technical aspects of the project, serving as its primary architect to enable institutions to securely share and use electronic health record data for Covid-19 research.

The Champions of Change Program acknowledges public servants and their industry partners who demonstrate excellence in delivery of services that impact people's lives. Awardees were recognized at a ceremony at the Willard Intercontinental in Washington, D.C.



NCATS CIO Sam Michael



Dr. Zu-Hang Sheng

NINDS's Sheng Wins FAPAC Mentorship Award

Dr. Zu-Hang Sheng, senior investigator and chief of NINDS's synaptic function section, recently received the 2021 Dr. Francisco S. Sy Award for Excellence in Mentorship from the Federal Asian Pacific American Council (FAPAC) of the Department of Health and Human Services.

Sheng, at NINDS for 25 years, is a leader in the field of neuronal organelle transport and axonal energy metabolism. He has made seminal contributions to the axonal transport of mitochondria and endo-lysosomes in maintaining energy and cellular homeostasis. His studies have elucidated important energy mechanisms of synaptic variability and regeneration failure, and conceptually advanced knowledge into mitochondrial pathology, energy deficits and lysosomal dysfunction in brain injury and neurodegeneration.

In addition to his scientific contributions, Sheng is an awarded mentor in training scientists at various levels—both in their research and career development. Many of his trainees have developed their own careers in academic, industry or government sectors; this includes 10 Asian or Asian American scientists who have successfully moved on to start their own research labs.

The Sy award is one of two established by HHS FAPAC in 2019 to recognize outstanding contributions from the Asian American/ Native Hawaiian/Pacific Islander (AANHPI) community. The honor recognizes an HHS employee who has provided exceptional mentorship to others and fostered their professional growth and career development.

Volunteers

CONTINUED FROM PAGE 1

15, 2020, when a staff member tested positive for the disease. NIAMS clinical staff immediately sprang into action and volunteered with screening and testing efforts to mitigate spread of the virus. Nearly 2 years later, NIAMS staff who supported response efforts at NIH and surrounding communities, reflect.

Research Nurse, Dedicated Volunteer

The desire to help others is ingrained in the DNA of research nurse April Brundidge who has a long history of volunteerism. Despite the fear that gripped everyone at the start of the pandemic, she was among the first to assist with testing NIH staff. Brundidge noted the importance of faith in helping her get through the experience, “I would just sit in my car and pray, ‘Please allow me to help these people and watch over me.’”

In the beginning, testing stations were set up in an outdoor pavilion near Lister Hill. For Brundidge, dealing with the weather—the sweltering heat of summer and the blistering cold of winter—was one of the biggest challenges. Volunteers made the most of the situation by joking or jumping around and using hand warmers to ward off the chill. Eventually, testing moved indoors.



PHS Commissioned Corps member conducts a screening at a Clinical Center entry point.

NIH staff and community members were eager to show appreciation for the volunteers. Hand-knitted scarves, doughnuts and posters with words of encouragement were just a few tokens of gratitude received by the team. “The community’s generosity and kindness will be a happy memory,” said Brundidge.

Nurse Practitioner, Fighter of Disparities

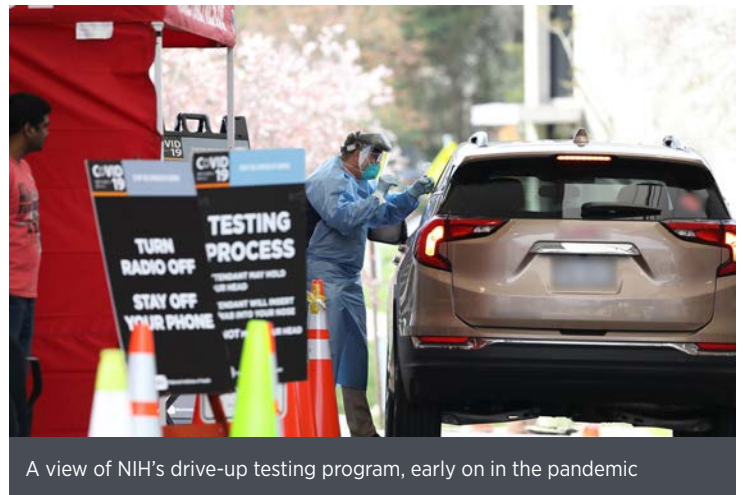
As a nurse practitioner and commander in the PHS Commissioned Corps, Alice Fike had previous experience on the frontlines of outbreaks, including the 2014 Ebola crisis in Africa. Fike was one of the first NIAMS staffers to assist with Covid-19 screening at the Clinical Center and was later assigned to the vaccination clinic.

It was natural for Fike to remember her experience with the Ebola vaccine trial in Liberia. She noticed a striking similarity between each nation’s willingness to participate in clinical trials for new treatments to fight infectious disease.

The Covid-19 pandemic shined a spotlight on health care disparities. Individuals in underserved communities faced increased risk of contracting Covid-19 and difficulties accessing screening and vaccination sites. Fike helps address some of these disparities through her work in the NIAMS Community Health Clinic, where she sees minority and foreign-born patients affected by rheumatic diseases. “I’m doing my part by answering patients’ questions and helping them navigate how to get a vaccine,” Fike said. “That’s a small thing, but a very meaningful thing.”

Postbac, EMT

Madie Alexander started her postbac training in translational immunology last July, in the middle of the lockdown. As it did with other trainees, Covid-19 forced her to swap precious lab hours for virtual training and online meetings. But it also provided a unique opportunity to join the fight against a global pandemic. A licensed emergency medical technician, Alexander wanted to



A view of NIH's drive-up testing program, early on in the pandemic

her training to contribute to the pandemic response. She signed up to volunteer with Medical Reserve Corps in Washington, D.C.

Alexander aspires to be a physician and plans to enroll in medical school after completing her NIH training. “It hasn’t been the ‘classic’ NIH experience,” she noted, “but it has been meaningful in many ways that are important for my growth. It’s also very exciting to be at the NIH when it matters more than ever before.”

Postbac, Maker of Masks

After graduating from Colorado College in May 2020, Hugh Alessi was enthusiastic to come to NIAMS as a trainee studying vasculitis. Covid-19 restrictions forced him to delay his move to Bethesda. While waiting in Colorado to learn when new trainees would be permitted to work on campus, Alessi joined friends on a hunt for sewing machines. The group sewed hundreds of masks and distributed them to emergency workers in Colorado Springs during the height of the mask shortage. After moving to the D.C. Metro area, Alessi immediately signed up to volunteer with the Maryland Medical Reserve Corps.

“I felt somewhat of a duty to get involved,” stated Alessi, who hopes to attend medical school next year. “I was exceedingly excited to help others and give back to my new community.”

Looking back, Alessi highlighted that trust was critical for success at screening and vaccination clinics. From patients trusting volunteers to calm their fears and effectively answer questions, to volunteers trusting patients to keep their masks on, the community must rely on each other to fight Covid-19.

Scientific Director, Vaccinator

After learning a NIAMS staff member was the first NIH'er to contract Covid-19, NIAMS scientific director Dr. John O'Shea felt the need to spring into action quickly. The initial priority was ensuring the safety of other staff. Next, he had to focus on how to keep labs functioning during the lockdown. He then volunteered to chair an online platform to submit ideas for tools and strategies to mitigate the disease. After he lost his mother to Covid-19 last spring, O'Shea's desire to volunteer became more personal. He decided to serve the community by helping with vaccinations.

Since becoming scientific director 15 years ago, O'Shea had not been directly involved with patient care—especially not giving shots. “I thought if I really want to get good at vaccinating, I should work with a nurse or a pediatrician,” O'Shea quipped. After training with both a nurse and a pediatrician for a few days, he began administering vaccines at NIH and Montgomery County clinics.

“It was a joyous experience,” he recalled, noting a sense of optimism after a year of pandemic-related challenges. “Working with a group of volunteers from so many different backgrounds, who all recognized the importance of the situation and just wanted to do their part to help, it was truly inspiring.”

In This Together

It has been 22 months since Covid-19 impacted all our lives. What started as a somber period of uncertainty has transitioned to hopeful signs that we are turning the tide. Though we are not yet at the finish line, none of this progress would be possible without the scientists who raced to develop vaccines, the teams who delivered them, and the many stalwart volunteers whose work supported every step of the response.

The continuing pandemic is affecting everyone differently. Everyone will have unique memories to share from this period. But the stories of volunteers highlight the importance of community during a time of crisis.

“Everyone working together as a team to fight this virus helped restore our sense of community,” said Alessi, “Covid reminded us that we're all in this together.” 

Drug Combination Shows Promise for Children with APL

A clinical trial has found the combination of all-trans retinoic acid, which is a metabolite of vitamin A, and arsenic trioxide is highly effective



Dr. Matthew Kutny examines Asher, who participated in the trial.

IMAGE: PATRICK DEAVOURS, CHILDREN'S OF ALABAMA

in children with standard- and high-risk acute promyelocytic leukemia, or APL. Nearly all patients in the trial survived for 2 years without experiencing a relapse.

None of the children with standard-risk APL required conventional chemotherapy,

and those with high-risk APL received just four doses of the chemotherapy drug idarubicin (Idamycin PFS). Results of the NCI-funded trial, conducted by the Children's Oncology Group, were published in *JAMA Oncology*.

“This is a remarkable achievement and will be the new standard of care,” said NCI's Dr. Malcolm A. Smith. “Twenty years ago, these patients would have been treated with intensive chemotherapy, including drugs that lead to heart problems later in life. By comparison, all-trans retinoic acid and arsenic trioxide have fewer acute or long-term side effects.”

APL accounts for 5 to 10 percent of acute myeloid leukemia diagnoses in children and adolescents. Symptoms of this blood and bone marrow cancer include excessive bleeding, easy bruising, low red blood cell count, fever and fatigue.

In this trial, 154 children between ages 1 and 22 who were newly diagnosed with APL were given oral all-trans retinoic acid, along with intravenous arsenic trioxide, daily for at least 28 days.

The children with standard- and high-risk APL had 2-year overall survival rates of 99 percent and 100 percent, respectively. One child with standard-risk APL died early in treatment, and 3 children experienced a relapse.

Less than 10 percent of the children experienced severe side effects, which included increased blood sugar, liver irritation and bleeding.

“Arsenic is often associated with being a poison, but it can also be a powerful medicine,” said Dr. Matthew Kutny of Children's of Alabama and the University of Alabama at Birmingham, the study's lead investigator. “Arsenic trioxide has been used in traditional Chinese medicine for millennia. The difference between a medication and a poison is really the dose. Over time, we have figured out

the exact dosing that would be effective in killing these types of leukemia cells without damaging other healthy tissues.”

Without the need for maintenance therapy, treatment time was reduced from more than 2 years to about 9 months. More follow-up will be needed to determine the long-term effects of this treatment in children.

SARS-CoV-2 Can Infect Inner Ear Cells

A commonly reported symptom of Covid-19 infection has been loss of taste and smell. NIAID-funded researchers have found another sensory connection: SARS-CoV-2 can infect inner ear cells, which could explain the hearing and balance issues reported by some Covid-19 patients. The findings appeared in *Communications Medicine*.

Hearing and balance symptoms often result from viral infections in the inner ear. But the effects of SARS-CoV-2 on the ear remain poorly understood.

The researchers identified 10 patients with Covid-19 who developed hearing loss after infection; 9 of them also experienced tinnitus, and 6 patients experienced vertigo. The timing of symptom onset suggested a correlation between Covid-19 infection and hearing loss.

The team collected inner ear tissue from patients who'd had surgery to treat severe vertigo. None of these donors had Covid-19.

Infection by SARS-CoV-2 requires certain proteins on the host cell surface. The researchers found these proteins on two types of inner ear cells—hair cells and Schwann cells. SARS-CoV-2 could infect both cell types in the lab.

Human inner ear tissue is difficult for researchers to obtain so the team developed models of inner ear tissue they could use for further investigation. First, they reprogrammed cells from human skin to become stem cells. They then directed the stem cells to develop into precursors of either hair cells or Schwann cells.

Like the human inner ear samples, these cells had the proteins needed for SARS-CoV-2 infection. SARS-CoV-2 infected the hair cell precursors and, to a lesser extent, the Schwann cells.

The team also generated 3D inner ear tissues, called organoids, from stem cells. These mimic the types of cells in the inner ear, and their spatial organization and function. The virus was able to infect the hair cell-like cells in the organoids.

Together, these results point to SARS-CoV-2 infection of the inner ear as a cause of Covid-19-associated hearing and balance issues. The work also opens a path for studying other viruses that affect hearing.—**Brian Doctrow**, *NIH Research Matters*



Caesar Sant, age 13, performs solo and (c) with NIH director Dr. Francis Collins.

PHOTOS: DEBBIE ACCAME



Above, Collins holds the mic as Sant says thank you to NIH in a dozen different languages. Below, Sant performs with pianist Robert Masi, an NCI postbac fellow.

PHOTOS: DANA TALESNIK, DEBBIE ACCAME

PATIENT PRODIGY

Young Violinist Warms Hearts at Thanksgiving Recital

There wasn't a dry eye in the house on Nov. 22 when 13-year-old Caesar Sant performed in the Clinical Research Center atrium. Each sweet note of his violin was a celebration of life.

Two months earlier, Sant had a bone marrow transplant at NIH to potentially cure him of sickle cell anemia, a chronically painful blood disorder.

"Even when Caesar was in pain, he practiced the violin," recounted his father, Lucas. "He found strength to hold it and play as if he wasn't sick. It brought immediate relief for many hours. I'm always saying the violin helped to save his life."



Caesar Sant with his dad

PHOTO: LUCAS SANT

Caesar took up violin at age 2 and already was playing concertos by age 4. Then, over an 18-month period, he suffered multiple strokes. The third and last one was life-threatening and left him temporarily paralyzed. He had to relearn to walk and how to play violin.

Now, infused with bone marrow donated by his 6-year-old sister Helen, Caesar's skin and lips are taking on a rosy hue.

At the Clinical Center concert, his father beamed: "My boy is strong, and he is free of pain."

Caesar opened the recital with Bach's *Air* followed by *Ave-Maria* and several other classical pieces, accompanied on piano by Robert Masi, a postbac cancer research fellow.

Dozens of patients, doctors and staff gathered

around, distanced and masked, along with many listening in awe from the hallways above.

"Caesar is one resilient young man who, despite [his illness] has become quite the violin virtuoso," said NIH director Dr. Francis Collins, who joined Caesar on guitar on Leonard Cohen's *Hallelujah*, Malotte's *The Lord's Prayer* and *You Raise Me Up* by Brendan Graham. Responding to calls for an encore, Caesar played Bach's *Partita No. 1*.

A grateful Lucas said, "I am forever an ambassador for NIH and the Children's Inn," where the two have resided for several months while Caesar underwent treatment at the Clinical Center.

After the performance, asked how he was feeling, Caesar exclaimed, "I feel great!"

The next day, Collins sent a Thanksgiving email to



all NIH staff: "Caesar's story is a stirring reminder of the fragility of human life and the gift of medical research, I am heartened to know that Caesar will go on to bless so many others with his extraordinary gift."—Dana Talesnik



ABOVE: Sant (front) stands with his spiritual and clinical care team. (From l): Chaplain Michael Zoosman; Dr. David Lang, chief, CC Office of Patient Safety and Clinical Quality; NHLBI's Dr. Matthew Hsieh, principal physician for Sant's transplant; Collins; Wynona Coles, NHLBI research manager; pianist Masi; and NHLBI PA Triscia Martin.

PHOTO: DEBBIE ACCAME