



Northwestern Medicine

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SUMMER 2021

REACHING FURTHER

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Transplant Access Program is impacting
lives in Chicago's underserved
communities • page 22**

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RHEW, '92 MD • 30**



The Music Plays On

In the midst of a pandemic, the Northwestern Medical Orchestra performed its second virtual concert for a remote audience of more than 300 on April 30, playing pieces by Piazzolla, Mozart, Brahms and more — seven of them live-streamed and 13 pre-recorded. The successful event was a reminder of the Northwestern community's resilience and support of one another. Founded in 2018 by fourth-year Medical Scientist Training Program student Bettina Cheung and MD student Michael Wang (who now serve as co-president and music director), the orchestra is made up of about 50 students, faculty, staff, and alumni. Shown here: Cellists Tiffany Ge, Abraham Ouweleen, and Brandon McNichol outside of the Simpson Querrey Biomedical Research Center. To learn more, visit sites.northwestern.edu/nmorchestra.

Photography by Teresa Crawford

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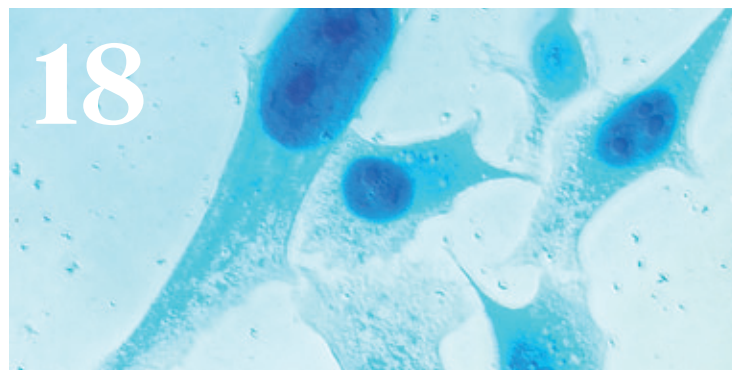
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FUTURE READY

As the world continues to grapple with the COVID-19 pandemic, Northwestern's New Center for Pathogen Genomics and Microbial Evolution is laying the groundwork to prevent future pandemics.



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FOR EVERY MAN

From teasing out determinants of health disparities to developing the first precision medicine treatment, Northwestern investigators are making critical impact on prostate cancer research and care.



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REACHING FURTHER

Northwestern's African American Transplant Access Program is impacting lives in Chicago's most underserved communities; plus a look at the latest research happening at the Northwestern University George M. O'Brien Kidney Research Core Center.



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PASSION FOR EQUITY

New assistant dean for medical education Linda Suleiman, MD, weaves health equity into her curriculum goals and her own career as an orthopaedic surgeon.

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ON THE COVER

Northwestern Medicine has made it a priority to address the pressing issue of health equity, in both diseases of the liver and the kidney. Learn more on page 22. Image/Getty

The Future Is Bright



T HIS SUMMER, FACULTY, TRAINEES, AND STUDENTS

arriving on campus will be greeted by a wave of optimism. For the first time, Northwestern University Feinberg School of Medicine is ranked 15th in the nation among research-oriented medical schools, according to the latest *U.S. News & World Report* rankings. Also, Northwestern Memorial Hospital was ranked No. 1 in Illinois for the tenth consecutive year and was among the top 10 hospitals in the U.S. for 2021–2022. Our research enterprise continues to grow, rising to an all-time high of \$643 million in awards, which support 667 principal investigators and more than 4,100 clinical trials. Our education programs likewise attract the best and brightest scholars in the nation, with more than 7,000 applicants for 160 seats in our entering MD class.

These metrics are certainly impressive, but they are not the sole reason for optimism. As COVID-19 vaccines impact the course of the pandemic, Feinberg is emerging stronger than ever, having demonstrated its remarkable resiliency, thanks in large part to our dedicated faculty and staff, who adapted to unforeseen circumstances over the past year and a half.

While we all have appreciated the ability to collaborate virtually while continuing to advance our mission, coming together in person has never been more refreshing or necessary. As teams plan for on-campus meetings and milestone events for the 2021–2022 academic year, there is a new sense of anticipation and eagerness. Personal connection and shared culture are welcome concepts for many who have been working remotely and those who have continued to work on campus, too. The happy reunions, new collaborations, and innovations ahead of us are all worth celebrating.

In this issue, we explore some of the innovations that grew and the connections that endured during the pandemic, including the creation of the new Center for Pathogen Genomics and Microbial Evolution in the Institute for Global Health. As COVID-19 swept Chicago, a team of four savvy Northwestern scientists sequenced the genome of SARS-CoV-2, the virus that causes COVID-19, in samples collected from patients in Chicago and discovered three distinct strains in the city. The center is now working toward a global surveillance and prevention strategy, which you can read more about in “Future Ready” (page 14).

Even as COVID-19 took center stage, Northwestern’s commitment to the advancement of science and treatment of life-threatening diseases remained steadfast. In the following pages, you will read about the incredible work investigators and practitioners have conducted across disciplines.

In “For Every Man” (page 18), we share how Northwestern scientists are dramatically changing the landscape for all patients with prostate cancer, both by teasing out the biological and social determinants of health disparities and by developing the first precision medicine treatment for this widespread disease.

In “Reaching Further” (page 22), we celebrate the achievements of Northwestern’s African American Transplant Access Program, which serves patients who suffer disproportionately from kidney and liver disease in Chicago’s underserved communities. In just under two years, the program has arranged for 14 transplants and seen a 55 percent increase in evaluations of Black patients. In the same story, you’ll learn about the leading-edge research happening in the Northwestern University George M. O’Brien Kidney Research Core Center.

As this issue demonstrates, we are stronger together. And, as our academic year kicks off another season of learning and discovery, I believe we will be emboldened by each other’s presence, whether in the classroom, lab, or clinic — or even in those casual hallway conversations we have all missed so much. As we strive for a return to normalcy, let’s welcome a spirit of optimism to lead the way.

With warm regards,

Eric G. Neilson, MD

Vice President for Medical Affairs
Lewis Landsberg Dean

Student Volunteers Administer Vaccines

Beginning in March, Feinberg offered students the opportunity to volunteer in Northwestern Medicine's COVID-19 vaccination effort, helping to administer vaccines to patients at Northwestern Medicine healthcare sites across Chicago.

"There is no doubt that Feinberg students have played critical roles during this pandemic, from COVID-19 outreach to obtaining PPE and now to vaccination. It is always exciting and gratifying to find opportunities where the health system and the medical education programs can work together to improve the care of patients. We are very fortunate to have an outstanding collaboration with our clinical partners," said Marianne Green, MD, the Raymond H. Curry, MD, Professor of Medical Education and vice dean for education.

"The COVID-19 vaccination efforts have been an incredible joint effort. The response

from our students has been overwhelming, and we are so impressed that over 100 students took time out of their busy schedules to train to be vaccinators. We look forward to incorporating more members of the Feinberg community in future efforts and our students' dedication to patients and the community is truly unparalleled," said Susan Goldsmith, MD, '08 GME, associate dean for student affairs.

Student volunteers attended vaccination training sessions coordinated by Feinberg leadership and Northwestern Memorial Hospital (NMH) staff, preparing them for the vaccination efforts. Prior to training, they were required to review vaccination modules from the CDC. Training sessions lasted 90 minutes and 25 students were trained at a time, while adhering to social distancing guidelines. NMH nurses assisted students with the training, beginning with a video presentation covering information

about Pfizer's COVID-19 vaccine, informed consent, documenting patient information in the electronic medical record, and how to safely administer an intramuscular injection using specialized retractable needles used for vaccination.

Following the presentation, students practiced inputting patient information in Epic's electronic medical record system and went through one-on-one skills validation tests with NMH nurses to evaluate needle safety and vaccination technique. Lastly, students were required to shadow a nurse as they administered vaccinations and administered vaccinations on their own under close supervision.

"All of my friends know that I love vaccines; they even send me pictures when they get their flu shots. So that being said, I was very excited when Feinberg announced that medical students were going to be trained to administer COVID-19 vaccines," said Casey Benzaken, a first-year student in the MD/MPH Program and student volunteer for Northwestern Medicine's COVID-19 vaccination efforts.

Benzaken's research interests in public health and vaccines motivated her to join the effort. Currently, she is collaborating with Feinberg faculty to study perceptions about flu vaccines and to develop more convenient settings to receive the vaccine. She said having the opportunity to practice administering injections with retractable needles and charting patient information in Epic, both of which she has never done before, helped her feel confident in administering vaccines to patients.

"Participating in the vaccine efforts has honestly been one of the most rewarding experiences of my life," she said.

Alan Soetikno, a first-year medical student, practices administering vaccine with NMH staff during a vaccination training session at the hospital. Image courtesy of Leah Fanning, MSN, RNC-OB.



Honoring the Class of 2021

Feinberg's 162nd commencement ceremony was held virtually on May 24 to accommodate public health measures in place due to the COVID-19 pandemic. But the gravity and excitement of the occasion was palpable all the same.

Eric G. Neilson, MD, vice president for Medical Affairs and the Lewis Landsberg Dean, introduced the ceremony and welcomed graduating medical students, faculty and family and friends of students to the virtual ceremony.

"You're entering a brave new world of managing priorities, a world where keeping people as healthy as we can becomes a collective responsibility of science and the medical profession," Neilson said. "There is a superb medical talent among our graduating class, but it's waiting to be tested by a team; tested to see if it can meet the special needs of human health in a time of crisis. I think you will."

Neilson introduced Morton Schapiro, PhD, president of Northwestern University, who reminded graduates to reach out to those who have inspired and motivated them during their journeys to becoming physicians. Neilson then delivered the commencement address to this year's graduates.

"In receiving medical advice, patients need to sense empathy and noble character from their physicians. After all, a social contract creates public trust. While I recognize you as a professional in a more personal way, society will not recognize you as a professional until your life actions reflect your willingness to put patient needs ahead of your own and until you are seen conducting your life for public good.

Preserving this social contract has never been more important than today," Neilson said.

Sandra Sanguino, '93 MD, MPH, '96, '97 GME, senior associate dean for Medical Education,

"Getting my medical degree means I will have a lifelong career in which I am able to care for people and help them through their most difficult moments."

Anna Briker, '21 MD, who will be starting her residency in internal medicine at McGaw Medical Center of Northwestern University this fall.



presented the members of the MD class of 2021. Names and pictures of the newly named physicians were featured as names were called. To conclude this year's commencement ceremony, Neilson virtually led the graduates in

reciting the Declaration of Geneva, the modern version of the Hippocratic oath.

Anna Briker, '21 MD, said that Feinberg's supportive environment including her peers, faculty and attending physicians, is what she will remember the most about her medical school career.

"It feels so incredible to be finally graduating. When I look back, I can't believe it's been four years because it flew by really fast, but then I think of how much I've learned and how much I've grown. I've had so many incredible mentors, from my Area of Scholarly Concentration mentor to my attendings at the VA and at Northwestern, and I think of all the formative experiences that I've had. I just can't wait to learn even more," Briker said. She will be starting her residency in internal medicine at McGaw Medical Center of Northwestern University this fall.

Christopher Gordon, '21 MD, '21 MBA, who will be starting his residency in internal medicine at the University of California, San Francisco in the fall, said he is looking forward to getting involved with work addressing racial disparities and health equity and hopes to apply for a cardiology fellowship after his residency.

"Feinberg has prepared me for the future in multiple ways. I'd say clinically, going through the preclinical modules and then being in the hospital for my various clerkships, I definitely feel like I'm ready to take on ownership of patients," he said. "But more than that, the community here has pushed me to excel and I feel ready to tackle whatever problems come in front of me."

1 Members of the Physician Assistant Program Class of 2021 were honored during a virtual commencement May 29, receiving their Master of Medical Science degrees. **2** The Department of Physical Therapy class of 2021 gathered at the Northwestern Physical Therapy Alumni Association reception the night before their June 25th virtual graduation ceremony. **3** Celebratory photo shared by Alexander Ayala, '21 MD. **4** Eric G. Neilson, MD, vice president for Medical Affairs and the Lewis Landsberg Dean, welcomed graduating medical students, faculty, family and friends to Feinberg's commencement ceremony, held virtually on May 24. **5** Celebratory photo shared by Dan Im, '21 MD. **6** Nicholas J. Volpe, Jr., '21 MD, being hooded by his father, Nicholas Volpe, MD, chair of Ophthalmology (photo courtesy of Volpe).



Celebrating with classmates (photo courtesy of Anuj Chokshi, '21 MD)

HONOR SOCIETIES

33

graduating students were inducted into the Alpha Omega Alpha medical honor society

23

graduating students were inducted into the Gold Humanism Honor Society

DUAL-DEGREE RECIPIENTS

10

graduates received a Master's Degree in Business Administration

5

graduates earned a Master's Degree in Medical Humanities & Bioethics

15

graduates received a Master's Degree in Public Health

13

graduates earned a PhD in the Medical Scientist Training Program



1



3



5



2



4



6



Expansion of 2Gether Project Awarded \$9 Million

Institute for Sexual and Gender Minority Health and Wellbeing (ISGMH) faculty member Michael Newcomb, PhD, has been awarded a five-year, \$9 million U01 grant from the National Institute of Allergy and Infectious Diseases for the expansion of his 2GETHER study. Newcomb is the principal investigator on 2GETHER and also serves as the director of ISGMH's newly established Center for Translational Health Research and Interventions Advancing Equity for Sexual and Gender Minorities.

2GETHER aims to reduce HIV incidence by teaching relationship and sexual health promotion skills to young men who have sex with men (YMSM) ages 16 to 34, a population disproportionately affected by HIV in the United States. Because YMSM's primary romantic and sexual partnerships account for a large proportion of HIV transmission in this population, relationship skills such as effective communication and conflict resolution are critical components of HIV prevention for YMSM.



Partnering for Drug Development

Lakeside Discovery, LLC, the collaboration between Northwestern University and Deerfield Management, will support the laboratory of Paul DeCaen, PhD, in a multi-year partnership to advance new therapies for genetically driven polycystic kidney disease.

"We are excited to partner with Deerfield to progress Paul DeCaen's project, which so clearly exemplifies the translational mission of Northwestern University," said Alicia Loffler, executive director of Northwestern's Innovation and New Ventures Office.

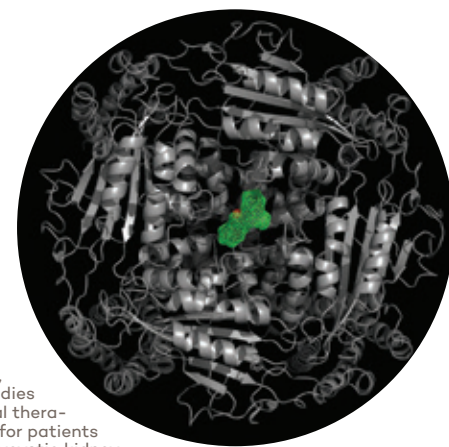
DeCaen, a member of the Department



of Pharmacology at Northwestern's Feinberg School of Medicine, has made seminal contributions to the field of Autosomal Dominant Polycystic Kidney Disease (ADPKD) over the past ten years. DeCaen's

lab works to develop a structural and functional understanding of how the mutations that cause ADPKD cause disease, along with new methods of identifying potential therapeutics to improve outcomes for patients.

The Lakeside Discovery program is designed to support investigators from early stages of drug discovery through to an Investigational New Drug (IND) application to the FDA.



The lab of Paul DeCaen, PhD, studies potential therapeutics for patients with polycystic kidney disease 2, which includes studying the structure and function of ion channels; shown here, a molecular structure of a PKD2 channel with a drug blocking the ion pore.

Big Ten Augmented Intelligence Bowl

Feinberg's Institute for Augmented Intelligence in Medicine (IAIM) is hosting the first annual Big Ten Augmented Intelligence (AI) Bowl, bringing together multi-disciplinary teams of investigators from institutions representing the Big Ten Academic Alliance to answer the question: "How can AI address health disparities?"

Participating institutions for the inaugural competition, which kicked off in February, include Northwestern University, Indiana University, Michigan State University, Pennsylvania State University, the University of Illinois Urbana-Champaign, the University of Minnesota, the University of Nebraska, and the University of Wisconsin-Madison.

"The Big Ten includes some of the best medical, engineering, and computer science schools or departments in the country. We wanted to connect with talented teams that represent these disciplines to tackle health disparities. We're thankful and inspired to see the great enthusiasm and support from the teams, mentors, and sponsors," said Abel Kho, MD, director of IAIM and professor of Medicine and of Preventive Medicine.

"We wanted to connect with talented teams that represent medicine, engineering, and computer science to tackle health disparities."

Abel Kho, MD



On April 30, each team presented at the semifinals, which was held virtually, pitching their case solution to a panel of judges who evaluated project proposals based on quality, feasibility, scalability, and presentation. Project proposals included using AI for

risk prediction, imaging analysis, augmented decision-making, or mitigating bias.

Five teams have advanced to the final round of the competition: the University of Illinois Urbana-Champaign, the University of Wisconsin-Madison, Pennsylvania State University, Indiana University, and Northwestern.

Northwestern's project, entitled "Reducing heart failure disparities through improving guideline-directed medication therapy with data analytics and augmented intelligence," is led by Jingzhi Yu, a student in Feinberg's Health Sciences Integrated PhD program.

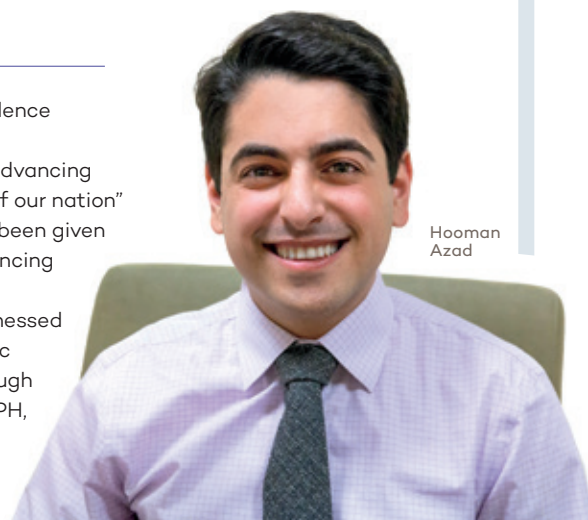
Teams that advanced to the final round were given mentoring sessions in May and additional resources to further develop their project proposals. These teams are also required to participate in a series of educational workshops and seminars held through September. The final round of the Big Ten AI Bowl will be held on October 22, where the remaining five teams will present their final case solution to a new panel of judges.

Medical Student Honored with Prestigious U.S. Public Health Service Award

Hooman Azad, a student in the MD/MPH degree program, has been awarded a 2021 Excellence in Public Health Award from the U.S. Public Health Service.

This national award is given to medical students who are public health champions advancing the U.S. Public Health Service mission to "protect, promote, and advance the health and safety of our nation" and who are helping address public health issues in their community. Since 2012, the award has been given by the U.S. Public Health Service to visionary medical students across the country who are advancing initiatives to improve social justice.

"As the director of the dual MD/MPH degree program at Northwestern University, I have witnessed firsthand how Hooman has successfully and tirelessly committed himself to advancing the public health priorities defined in both Healthy People 2030 and the National Prevention Strategy through research, applied public health work, and voluntary clinical commitments," said Mita Goel, MD MPH, associate professor of Medicine in the Division of General Internal Medicine and Geriatrics.

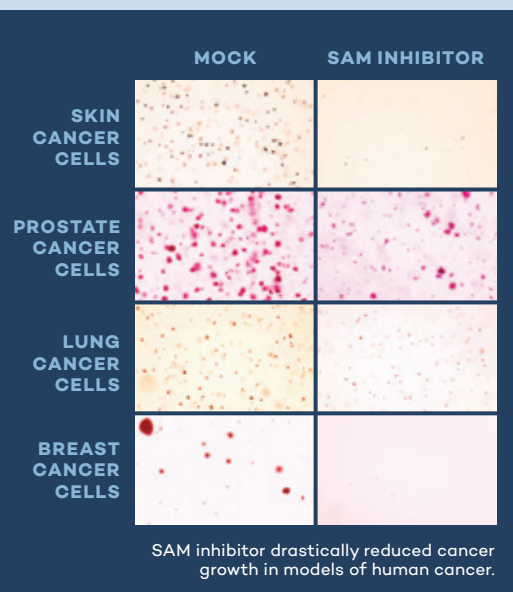


Hooman Azad

RESEARCH BRIEFS

DISEASE DISCOVERIES

INHIBITING SAM BIOSYNTHESIS TO SLOW TUMOR GROWTH



Many cancers hijack a metabolic mechanism known as the mTOR pathway to fuel growth and proliferation, and inhibiting that pathway could slow tumor growth, according to a Northwestern Medicine study published in *Molecular Cell*.

Investigators found that different types of cancer — including breast cancer, prostate cancer, and melanoma — have different mTOR regulation mechanisms, but all exhibited specific genes that activate mTOR. The activation produces large amounts of S-adenosylmethionine (SAM), a metabolite required for protein synthesis. This presents an opportunity, Ben-Sahra said.

“We don’t want to target mTOR everywhere in the body; that could likely have some nasty

side effects,” Ben-Sahra said. “But this new metabolic pathway is very important for cancer growth because it is highly activated.”

To investigate the phenomenon, Ben-Sahra and his collaborators created xenografts, transplanting patient-derived cancer cells into mice and applying the SAM inhibitor to these subjects. Though the inhibitor was originally designed as a tool for biochemical research, it had the effect of slowing cancer growth without serious consequences, according to Ben-Sahra.

Elodie Villa, PhD, a postdoctoral fellow in the Ben-Sahra laboratory, was lead author of the study.

This work was supported by the Developmental Therapeutics Core at Northwestern University and the Robert H. Lurie Comprehensive Cancer Center National Cancer Institute grant CA060553; the Northwestern proteomics core; the National Institutes of Health grants R00CA194192-04, R01GM135587, K08HL128867 and R01HL149883; the LAM Foundation Career Development Award LAM0127C01-18; the Tuberous Sclerosis Alliance postdoctoral fellowship (SP0057487) and the Philippe Foundation and Servier Institute prizes.

DISEASE DISCOVERIES

New Spherical Nucleic Acid ‘Drug’ Kills Tumor Cells in Humans with Glioblastoma



An early clinical trial in individuals with the deadly brain cancer, glioblastoma, showed an experimental spherical nucleic acid (SNA) drug developed by Northwestern University scientists was able to penetrate the blood-brain barrier and trigger the death of tumor cells.

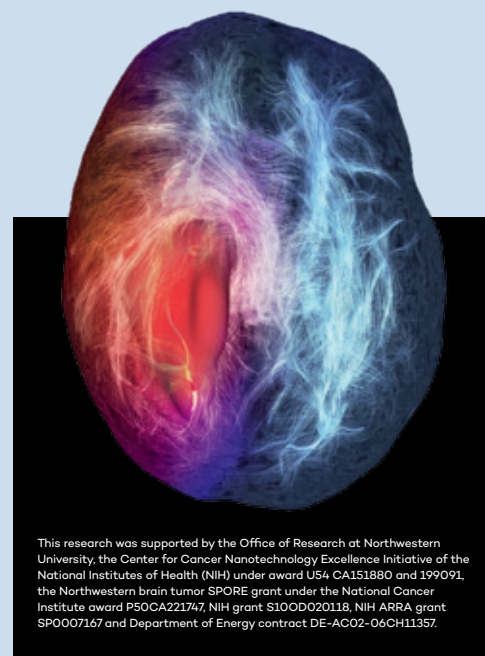
This study, published in *Science Translational Medicine*, is the first time a nanotherapeutic has been shown to cross the blood-brain barrier when given through intravenous infusion and alter the genetic machinery of a tumor to cause cell death. The drug crossed the blood-brain barrier, dialed down the level of a cancer-causing gene and promoted tumor cell death.

The results build upon previously published pre-clinical research by the Northwestern team. “We showed the drug, NU-O129, even at very

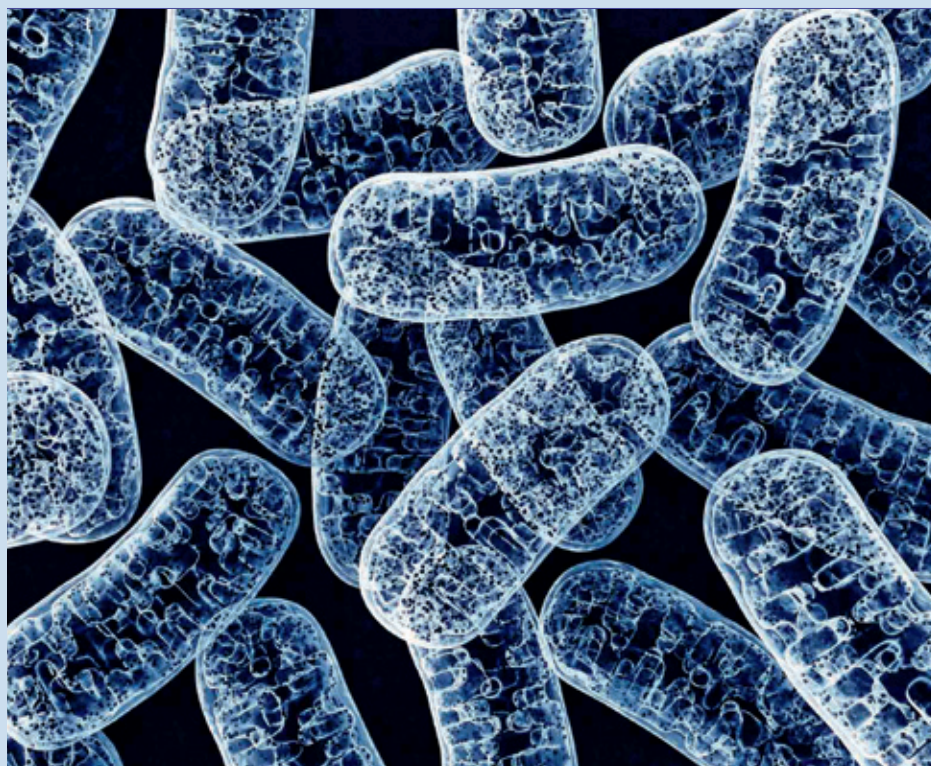
small doses, causes tumor cells to undergo what’s called apoptosis or programmed cell death,” said lead investigator Priya Kumthekar, MD, ’08 ’11 ’12 GME, associate professor in the Ken and Ruth Davee Department of Neurology Division of Neuro-oncology. “It’s a remarkable finding in humans that confirms what we had previously seen in our animal studies.”

Now Northwestern scientists plan to use this technology to advance this type of therapeutic for brain tumor care.

The phase 0 study was conducted with eight individuals who had recurrent glioblastoma at the Robert H. Lurie Comprehensive Cancer Center of Northwestern University. In phase 0, investigators use a small dose of medication to make sure it isn’t harmful to humans before they start using it in higher doses in larger clinical trials.



This research was supported by the Office of Research at Northwestern University, the Center for Cancer Nanotechnology Excellence Initiative of the National Institutes of Health (NIH) under award U54 CA151880 and 199091, the Northwestern brain tumor SPOR grant under the National Cancer Institute award P50CA221747, NIH grant S10OD020118, NIH ARRA grant SP0007167 and Department of Energy contract DE-AC02-06CH11357.



SCIENTIFIC ADVANCES

Mitochondria Could Boost Immunotherapy Effectiveness



Boosting mitochondrial function in a subpopulation of T-cells could make cancer immunotherapy more effective, according to a recent study published in the *Proceedings of the National Academy of the Sciences* (PNAS).

Those cells, known as CD1d-restricted natural killer T (NKT) cells, are much more reliant on mitochondrial metabolism during development when

“IF WE CAN MANIPULATE THESE CELLS, WE MIGHT BE ABLE TO MAKE THIS CELL LIVE LONGER IN AN IMMUNOTHERAPY CONTEXT.”

compared with conventional CD4+ T-cells. That makes those cells an attractive target for boosting immune function in cancer immunotherapy, according to Chyung-Ru Wang, PhD, professor of Microbiology-Immunology and senior author of the study, whose findings shed light on possible routes scientists could take to increase their population.

“If we can manipulate these cells, we might be able to make this cell live longer in an immunotherapy context,” said Wang,

who is also a member of the Robert H. Lurie Comprehensive Cancer Center of Northwestern University.

Conventional T-cells are the body’s main line of defense against viruses and bacteria. On the other hand, NKT cells are less numerous, but produce far more inflammatory cytokines compared to conventional T-cells. This places them in a unique position between the innate or immediate immune response and the adaptive immune response, according to Wang. “Within hours, the innate immune response begins, but the adaptive response can take more than a week to establish,” Wang said. “By producing cytokines and activating other immune cells, these NKT cells can produce a response in about a day.”

Navdeep Chandel, PhD, the David W. Cugell, MD, Professor of Medicine in the Division of Pulmonary and Critical Care, a professor of Biochemistry and Molecular Genetics and a member of the Lurie Cancer Center, was a co-author of the study.

This work was supported by NIH Grants R01 AI43407 and R01 AI057460.

CLINICAL BREAKTHROUGHS

‘SWEAT STICKER’ DIAGNOSES CYSTIC FIBROSIS ON THE SKIN IN REAL TIME



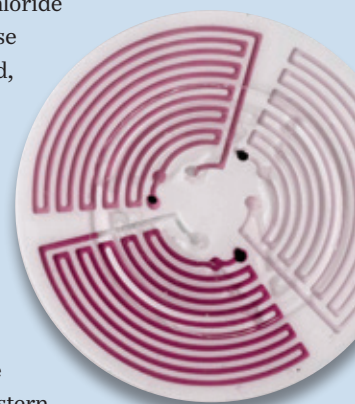
A Northwestern University-led team of scientists has developed a novel skin-mounted sticker that absorbs sweat and then changes color to provide an accurate, easy-to-read diagnosis of cystic fibrosis within minutes, according to a study published in *Science Translational Medicine*.

While measuring chloride levels in sweat to diagnose cystic fibrosis is standard, the soft, flexible, skin-like “sweat sticker” offers a stark contrast to current diagnostic technologies, which require a rigid, bulky, wrist-strapped device to collect sweat.

After developing the sweat sticker at Northwestern, the investigators validated it in clinical pilot studies involving cystic fibrosis patients and healthy volunteers at the Cystic Fibrosis Center at Ann & Robert H. Lurie Children’s Hospital of Chicago. The sticker showed enhanced performance in collected sweat volume and equivalent accuracy to traditional platforms.

Biointegrated electronics pioneer John A. Rogers, PhD, led the device development. Rogers is the Louis Simpson and Kimberly Querrey Professor of Materials Science and Engineering, Biomedical Engineering and Neurological Surgery in the McCormick School of Engineering and Feinberg School of Medicine and the director of the Querrey Simpson Institute for Bioelectronics. Tyler Ray, PhD, who was a postdoctoral fellow in the Rogers lab at the time of the research, is the paper’s first author. He is now an assistant professor of mechanical engineering at the University of Hawai’i at Mānoa.

This work was supported by the Querrey Simpson Institute for Bioelectronics at Northwestern University, University of Hawai’i at Mānoa, Hawai’i Community Foundation (Robert C. Perry Fund), Ann & Robert H. Lurie Children’s Hospital of Chicago, Stanley Manne Children’s Research Institute, and Northwestern Memorial Hospital. It was also supported by the National Institutes of Health (award numbers P20GM113134 and R43AGO67835).



CLINICAL BREAKTHROUGHS

IMPROVING SURVIVAL FOR PATIENTS WITH MALIGNANT GLIOMAS



A novel therapy engineered by Northwestern Medicine investigators improved progression-free and overall survival for patients with newly diagnosed malignant gliomas, according to results from a recent phase 1 clinical trial published in *The Lancet Oncology*.

In the study, investigators evaluated the safety of a novel therapy called NSC-CRAD-S-pk7 in patients newly diagnosed with malignant gliomas. NSC-CRAD-S-pk7 is an oncolytic adenovirus delivered by neural stem cells, or progenitor cells from the central nervous system that cross the blood-brain barrier to deliver therapeutic molecules to cancer cells.

“This is the first-in-human clinical trial to test the neural stem cell delivery of an engineered oncolytic adenovirus.

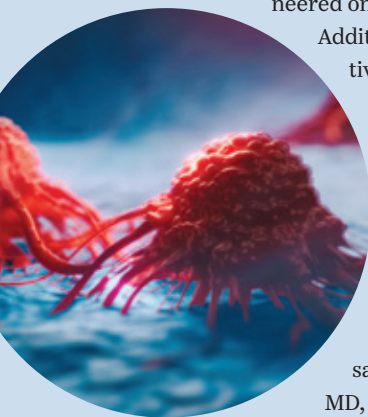
Additionally, it is distinctive among neuro-oncology and virotherapy trials because it includes patients with newly diagnosed gliomas, rather than recurrent disease,” said Maciej Lesniak, MD, chair and Michael

J. Marchese Professor of

Neurosurgery, and senior author of the study.

Malignant gliomas are the most common primary brain tumors in adults, with no current effective treatment options and an average survival rate of 14 to 21 months. Glioma cells are notoriously resistant and difficult to treat, underscoring a crucial need for innovative and effective therapies that cause fewer adverse side effects than traditional therapies such as chemotherapy and radiation.

This work was supported by the National Institutes of Health.



CLINICAL BREAKTHROUGHS

Evaluating Esophageal Hypervigilance and Symptom Anxiety



Measuring levels of hypervigilance and symptom-specific anxiety may improve health-care providers' understanding of patient outcomes for severe esophageal diseases and treatment strategies, according to a Northwestern Medicine study published in the journal *Gastroenterology*.

“If we identify people who have a lot of symptom anxiety and hypervigilance, we could in parallel treat the disease and their hypervigilance and anxiety and get them to a better place in terms of living with their symptoms. Those are the people who are going to have optimal outcomes,” said John Pandolfino, MD, '94, '96, '01 GME, the Hans Popper Professor, chief of Gastroenterology and Hepatology in the Department of Medicine and senior author of the study.

Eosinophilic esophagitis (EOE) is a chronic inflammatory disease caused by excess build-up of white blood cells called eosinophils in the esophagus. This buildup

is induced by an allergic reaction from foods such as dairy or wheat, causing the esophagus to narrow and become inflamed,

“IF WE IDENTIFY PEOPLE WHO HAVE A LOT OF SYMPTOM ANXIETY AND HYPERVIGILANCE, WE COULD PARALLEL TREAT THE DISEASE AND THEIR HYPERVIGILANCE AND ANXIETY AND GET THEM TO A BETTER PLACE IN TERMS OF LIVING WITH THEIR SYMPTOMS.”

making it difficult to breathe or swallow. The disease, which is thought to be genetic, affects men more commonly than women and current treatments include strict food elimination diets, topical corticosteroids, proton pump inhibitors, or a combination.

This work was supported by the National Institute of Diabetes and Digestive and Kidney Diseases grant 1P01DK117824-01.



DISEASE DISCOVERIES

MUSCLE'S SMALLEST BUILDING BLOCKS DISAPPEAR AFTER STROKE



After suffering a stroke, patients often are unable to use the arm on their affected side. Sometimes, they end up holding it close to their body, with the elbow flexed.

In a new study, Northwestern Medicine and Shirley Ryan AbilityLab investigators have discovered that, in an attempt to adapt to this impairment, muscles actually lose sarcomeres — their smallest, most basic building blocks. Stacked end to end (in series) and side to side (in parallel), sarcomeres make up the length and width of muscle fibers. By imaging biceps muscles with three noninvasive methods, the scientists found that stroke patients had fewer sarcomeres along the length of the muscle fiber, resulting in a shorter overall muscle structure.

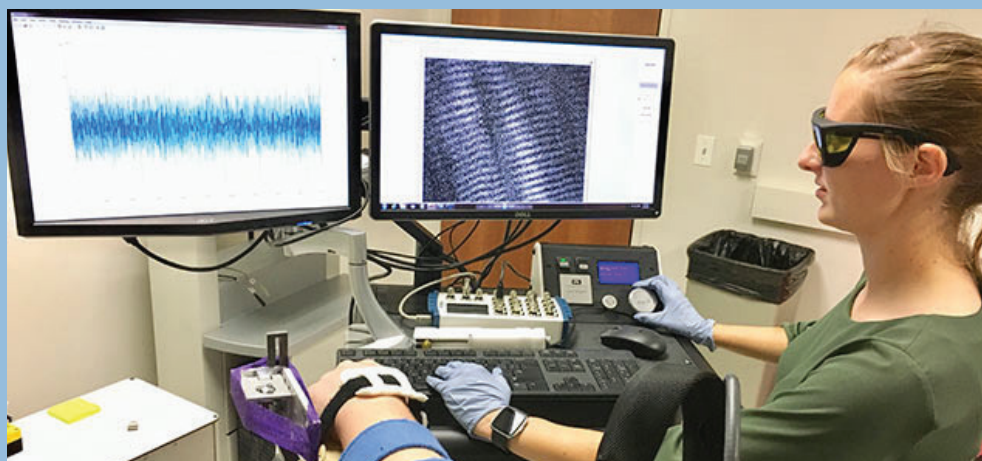
This finding is consistent with the common patient experience of abnormally tight, stiff muscles that resist stretching, and it suggests that changes in the muscle potentially amplify existing issues caused by stroke, which is a

brain injury. The team hopes this discovery can help improve rehabilitation techniques to rebuild sarcomeres, ultimately helping to ease muscle tightening and shortening.

“This is the most direct evidence yet that chronic impairments, which place a muscle in a shortened position, are associated with the

loss of serial sarcomeres in humans,” said Wendy Murray, PhD, professor of Physical Medicine and Rehabilitation, and the senior author of the study, which was published in the *Proceedings of the National Academy of Sciences*.

This work was supported by National Institutes of Health grants SP01AG049665, SP01HL071643, and ST32HL076139-15, and SDP1DK113643-03, with support from the Ford Foundation.



PhD candidate Amy Adkins uses microendoscopy to image a patient's sarcomeres (pictured on the upper right screen).

SCIENTIFIC ADVANCEMENTS

Hippocampus Creates ‘Shapes of Knowledge’



Neurons in the hippocampus encode a spatial map of learned knowledge, helping humans and other mammals navigate the world, according to a study published in *Nature*.

The arrangement and activation order of hippocampal neurons can represent both a physical environment and an abstract concept, such as position in a social group. The hippocampus is prone to injury after stroke and is often affected in epilepsy and other neurodegenerative disorders, so learning more about how information is structured can help therapies in the future, according to Lucas Pinto, MD, PhD, assistant professor of Physiology and co-author of the study.

“UNDERSTANDING THE PRINCIPLES AND DETAILS OF HOW THE HIPPOCAMPUS SUPPORTS COGNITIVE BEHAVIOR COULD HAVE BIG IMPACTS ON HOW WE TREAT HIPPOCAMPAL DYSFUNCTION DOWN THE ROAD.”

“Understanding the principles and details of how the hippocampus supports cognitive behavior could have big impacts on how we treat hippocampal dysfunction down the road,” Pinto said.

This study was conducted in the laboratories of Carlos Brody, PhD, the Wilbur H. Gantz III '59 Professor of Neuroscience at Princeton University, and David Tank, PhD, the Henry L. Hillman Professor of Neuroscience and co-director of the Princeton Neuroscience Institute.

This work was supported by the National Science Foundation (award number DGE-1324585) and the National Institutes of Health (R01HD084009).

MEDIA SPOTLIGHT

Chicago Tribune

Untreated Traumas in Arrested Juveniles Linger 15 Years Past Incarceration

Fifteen years after 1,829 study participants were detained in Cook County's Temporary Juvenile Detention Center, 64 percent of males and 35 percent of females with a psychiatric disorder during detention still had a disorder, according to recent data from the Northwestern Juvenile Project — a long-term study of mental health needs and outcomes of delinquent youths after detention — led by Linda Teplin, PhD, vice chair for Research in the Department of Psychiatry and Behavioral Sciences, and the Owen L. Coon Professor of Psychiatry and Behavioral Sciences.

"We've been studying incarcerated populations for 40 years," said Teplin. "These kids enter with a lot of psychiatric problems, and they continue because they never receive adequate treatment. And the blame is not just on the juvenile justice system, but these kids don't get treatment when they go back to their communities."

The New York Times

Scientists Drove Mice to Bond by Zapping Their Brains with Light

Northwestern graduate student Mingzheng Wu put two male mice in a cage and, from his computer, switched on a blue light implanted in the front of each animal's brain, causing neurons to fire. When Wu zapped the two mice at the same time and at the same rapid frequency, he put that portion of their brains in sync, causing them to get along. When Wu zapped each animal's cortex at frequencies different from the other's, the mice bonded far less. The experiment, conducted in the neurobiology lab of Yevgenia Kozorovitskiy, PhD, associate professor of Physiology at the Weinberg College of Arts and Sciences, demonstrates the value of being able to look at more than one brain at the same time when studying behaviors.



CNN

COVID-19 Vaccines Do Not Harm Placenta, Contrary to Social Media Misinformation

"We have reached a stage in vaccine distribution where we are seeing vaccine hesitancy, and this hesitancy is pronounced for pregnant people," said Emily Miller, MD, MPH, assistant professor of Obstetrics and Gynecology and of Psychiatry and Behavioral Sciences, in a statement.

In a new study, Miller and her team confirmed that COVID-19 vaccines do not harm

the placenta and affect pregnancy adversely as a result.

"Our team hopes these data, albeit preliminary, can reduce concerns about the risk of the vaccine to the pregnancy," said Miller, co-author of a study published in *Obstetrics & Gynecology*, the first to examine the impact of COVID-19 vaccines on the placenta.

USNews

Surprisingly Few Women May Have Good Heart Health Before Pregnancy

Cardiovascular disease is the leading cause of a mother's death during pregnancy and postpartum, making up 26.5 percent of pregnancy-related deaths, according to the American College of Obstetricians and Gynecologists. A new study — looking at data from all U.S. women, ages 20–44, who gave birth from 2016 to 2018 — set out to find out if heart health was declining before women became pregnant, and if so, in which parts of the country.

Investigators found the percentage of women entering pregnancy with good heart health decreased during the study period from 43.5 percent to 41.3 percent.

"I was quite surprised by those numbers," said investigator Natalie Cameron, MD, a resident in internal medicine at the McGaw Medical Center of Northwestern University. "Our rates and trends were mostly driven by overweight and obesity. However, up to 4 to 5 percent of women in some states had two or more risk factors, demonstrating an important contribution of diabetes and hypertension to unfavorable health prior to pregnancy."

Presented at the American Heart Association's virtual Epidemiology, Prevention, Lifestyle & Cardiometabolic Health Conference, the findings are considered preliminary until published in a peer-reviewed journal.

FACULTY AWARDS & HONORS



Shubhada Ahya, MD, professor of Medicine in the Division of Nephrology and Hypertension, has received the Medical Advisory Board Distinguished Service Award from the National Kidney Foundation. 📷 1

Andrew D. Bunta, '67 MD, '74 GME, as- sociate professor of Orthopaedic Surgery, has been named a "Pillar of the Orthopaedic Profession" by the American Orthopaedic Association. The honor recognizes orthopaedic surgeons for their significant dedication, leadership and contributions to the field. 📷 2

Phyllis Zee, MD, PhD, '87 GME, the Benjamin and Virginia T. Boshes Professor of Neurology, has received the Lifetime Achievement Award from the National Sleep Foundation (NSF). The award recognizes contributions to sleep medicine

and the public health mission of the NSF.

Lucy Bilaver, PhD, associate professor of Pediatrics, has been named director of the Health Sciences Integrated PhD (HSIP) program in the Center for Education in Health Sciences, the education and training center within the Institute for Public Health and Medicine (IPHAM). 📷 3

Richard Epstein, PhD, MPH, research professor of Psychiatry and Behavioral Sciences, has been named associate director of the HSIP.

The following three members of the Feinberg faculty have been elected members of the American Academy of Arts and Sciences, one of the nation's oldest and most prestigious honorary societies:

Elizabeth McNally, MD, PhD, the Elizabeth J. Ward Professor of Genetic

Medicine, director of the Center for Genetic Medicine and a professor of Medicine in the Division of Cardiology; **Thomas McDade, PhD**, a professor of Anthropology in the Weinberg College of Arts and Sciences and in Feinberg's Department of Medical Social Sciences; 📷 4 and **Catherine Woolley, PhD**, a professor of Neurobiology in the Weinberg College of Arts and Sciences and in the Ken and Ruth Davee Department of Neurology at Feinberg.

Amy Paller, MD, '83 GME, chair and Walter J. Hamlin Professor of Dermatology and a professor of Pediatrics, received the Tanioku Kihei Memorial Award from the European Academy of Dermatology and Venereology, and was invited for Honorary Membership

status in the Society for Investigative Dermatology, the American Academy of Dermatology and the Japanese Society for Investigative Dermatology. Paller is also the recipient of the American Skin Association 2021 David Martin Carter Mentor Award.

Todd Florin, MD, MSCE, director of research for the Division of Emergency Medicine at Ann & Robert H. Lurie Children's Hospital of Chicago and associate professor of Pediatrics, has been elected Strategy and Operations Officer at the Society for Pediatric Research. 📷 5

Philip Greenland, MD, the Harry W. Dingman Professor of Cardiology and professor of Preventive Medicine, has been named the recipient of the Society of Cardiovascular Computed Tomography 2021

Arthur S. Agatston Cardiovascular Disease Prevention Award for his contributions to the field of cardiovascular disease prevention.

Stephen Miller, PhD, the Judy Gugenheim Research Professor of Microbiology-Immunology, has received the 2021 Technology Innovation and Development Award from the Society for Biomaterials.

Bonnie Spring, PhD, director of the Center for Behavior and Health in the Institute for Public Health and Medicine (IPHAM) and professor of Preventive Medicine and Psychiatry and Behavioral Sciences, has received the Society of Behavioral Medicine's Distinguished Scientist Award. 📷 6

Dimitri Krainc, MD, PhD, chair and the Aaron Montgomery Ward Professor of Neurology, has received a Research

Program Award grant from the National Institute of Neurological Disorders and Stroke. The award allows investigators freedom to embark upon long-term research projects without the constraints of specific aims and provides eight years of funding totaling about \$9 million.

Thomas Meade, PhD, the Eileen M. Foell Professor of Cancer Research and professor of Radiology, was awarded the 2021 Northwestern University Teaching Award. 📷 7

Jacqueline Pongracic, MD, chief of Allergy and Immunology in the Department of Pediatrics and professor of Pediatrics in the Division of Allergy and Immunology, received the Distinguished Clinician Award at the annual meeting of the American Academy of Allergy, Asthma and Immunology.

FUTURE



photo by Teresa Crawford

Northwestern's new Center for Pathogen Genomics and Microbial Evolution is laying the groundwork to prevent future pandemics.

by **Bridget Kuehn**

Above: Ramon Lorenzo Redondo, PhD, Lacy Simons, Egon Ozer, MD, PhD and Judd Hultquist, PhD — the team behind the new Center for Pathogen Genomics and Microbial Evolution.

Just as the COVID-19 pandemic started to upend many Chicagoans' lives in March 2020, a team of Northwestern scientists made a startling discovery. By sequencing the genome of SARS-CoV-2, the virus that causes COVID-19, in samples collected from patients in Chicago, they

discovered three distinct strains were already circulating in the city.

"The virus had already spread at least three different ways across the globe to arrive in Chicago," says Egon Ozer, MD, PhD, '08, '12 GME, assistant professor of Medicine in the Division of Infectious Diseases. The team also discovered that some of the genetic changes in the viral genome increased the amount of virus in the airways of infected people, making them more likely to spread the virus to others and hastening the spread of the virus in the area.

READY

These discoveries were made possible by a nimble collaboration that included Ozer, an expert in bacterial genome sequencing; virologist Judd Hultquist, PhD, assistant professor of Medicine in the Division of Infectious Diseases; bioinformatics expert Ramon Lorenzo-Redondo, PhD, a research assistant professor of Medicine in the same division; and laboratory coordinator and biomedical researcher Lacy Simons. During the course of the pandemic, this team has overseen the sequencing of more than 1,800 samples of SARS-CoV-2 from patients in the Chicago area.

To continue helping with SARS-CoV-2 global surveillance efforts — and begin monitoring for new potential viral and microbial threats — the medical school has launched a new Center for Pathogen Genomics and Microbial Evolution (CPGME) in the Institute for Global Health, with Ozer serving as director.

“When COVID-19 came along, it really crystallized the power of whole-genome sequencing of pathogens,” says Ozer. “It’s imperative for understanding where a pandemic comes from, how it is spreading, how it can be stopped, and how to prevent the next one.”

Rapid Response Team

The new center will provide the expertise and analytic tools required to facilitate ongoing analysis of the genetic changes occurring in SARS-CoV-2, as well as help to identify potential new pandemic threats. It will also use genomics to better understand what drives the emergence of antimicrobial resistance and how to stop it.

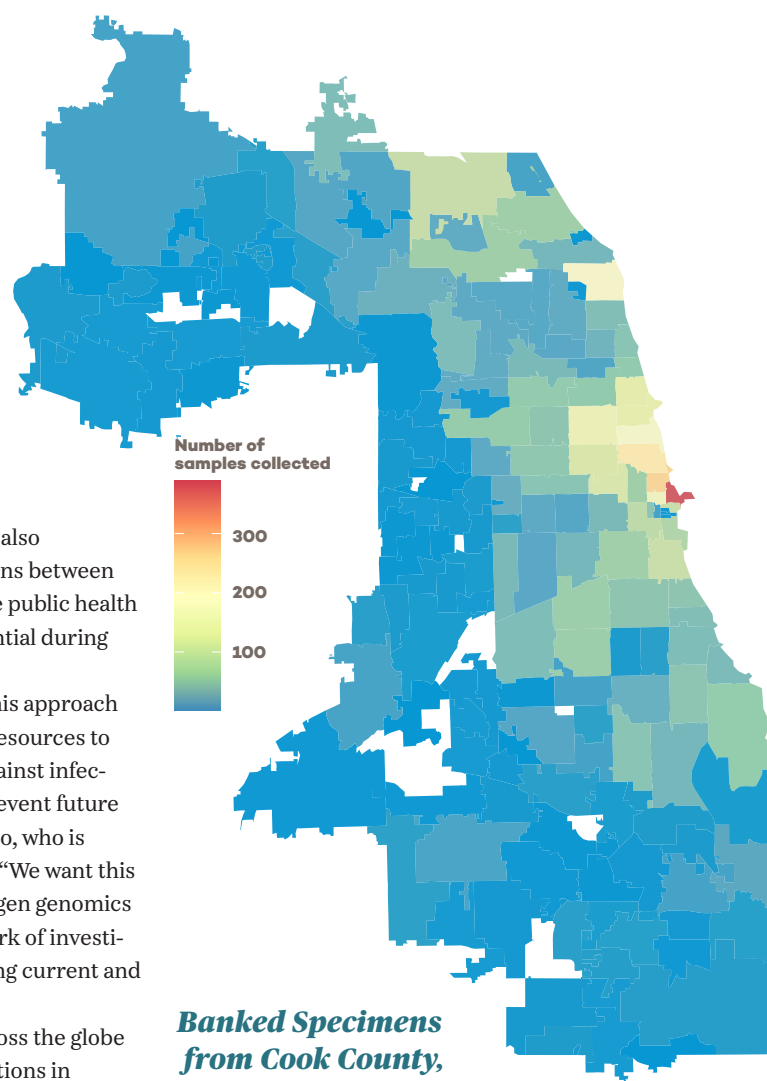
“Pathogens are always changing,” explains Hultquist, associate director of the new center. “Viruses change very quickly, bacteria can change very quickly, and by continuing to track

the changes that they’re accumulating in their genomes we can map how they’re being transmitted within a community or even within a workplace. But until now, Northwestern hasn’t had a dedicated center with a focused investment in these microbial sequencing techniques and technologies.”

In addition to providing an in-house resource, the center will also continue to foster the collaborations between basic scientists, clinicians, and the public health departments that have been essential during this pandemic.

“When entirely developed, this approach can be one of the most powerful resources to inform public health measures against infectious pathogens and ultimately prevent future epidemics,” says Lorenzo-Redondo, who is CPGME’s bioinformatics director. “We want this center to build expertise in pathogen genomics and evolution to generate a network of investigators who are capable of managing current and future infectious disease threats.”

That network will extend across the globe through partnerships with institutions in Nigeria and Pakistan, where few pathogens have undergone genomic sequencing. Ozer explains that as sequencing becomes less expensive and more user-friendly, access to the technology is expanding. However, many organizations don’t yet have the bioinformatics expertise necessary to analyze microbial genomics data, which requires different techniques than human or animal genomics. ▶

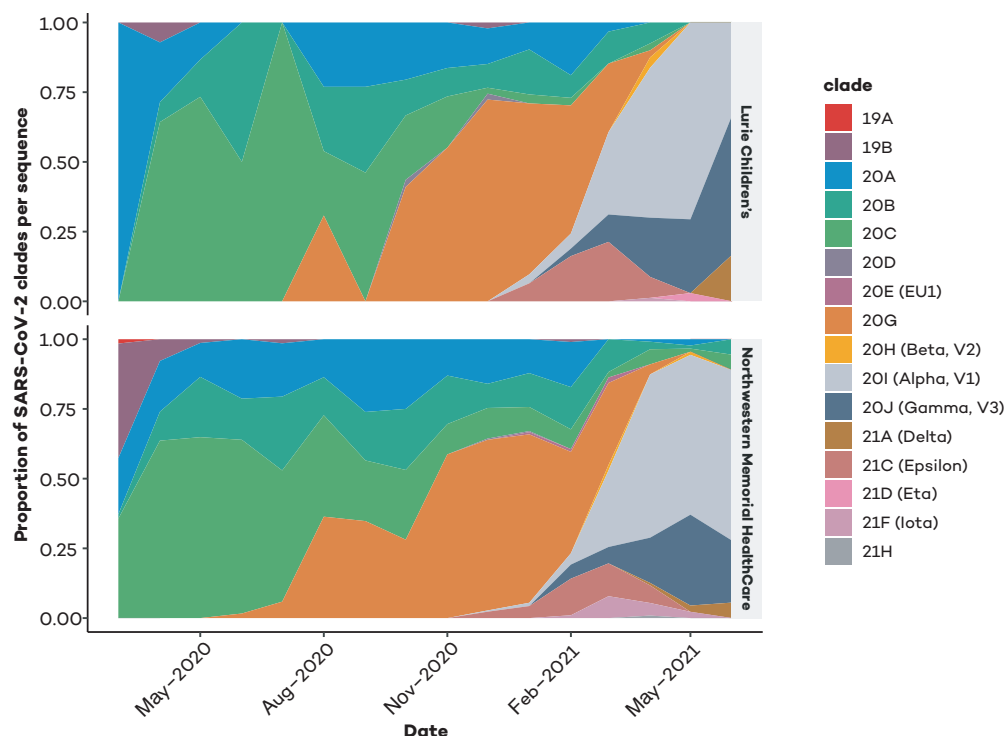


Banked Specimens from Cook County, Illinois

The CPGME has collected viral specimens from individuals with COVID-19 across Chicago and Cook County since March 2020. Genomic sequencing of some of these specimens helps the team understand how the SARS-CoV-2 virus is spreading and changing in the area.

Proportion of SARS-CoV-2 Clades Among CPGME Sequences

This chart shows monthly proportions of the most common SARS-CoV-2 clades found among the sequences obtained by CPGME. The distribution of clades within adult and pediatric populations are very similar, indicating that there are not major differences between the two populations. By tracking the viral variants, CPGME can study the population dynamics occurring in the Chicago area and compare it to the global epidemic. This information is key to designing public health strategies.



“We want this center to build expertise in pathogen genomics and evolution to generate a network of investigators capable of managing current and future infectious disease threats.”

Ramon Lorenzo-Redondo, PhD

“What we think we can contribute by partnering with scientists in Pakistan and Nigeria is to build up their capacity to perform these analyses, help them identify emerging pathogens, and help them understand transmission in their communities,” Ozer says.

Ongoing Surveillance

Those international partnerships and the CPGME team’s ongoing surveillance of changes in the SARS-CoV-2 genome are essential to helping identify new variants that may pose enhanced risks. For example, collaborations have already led to the characterization of a concerning variant circulating in West Africa, according to Hultquist.

“Until we really have a handle on what kind of variation there is in the virus worldwide, we are not going to get the pandemic under control,” he says.

The team is also continuing to track changes in the virus locally. Last summer, they identified a new strain that went on to drive the winter peak in infections. They were also the first group to identify the arrival of the Alpha variant, a more transmissible version of the virus that first emerged in the United Kingdom

and documented how it quickly became the dominant strain in Chicago.

“Chicago is a very interesting place to study the virus because it has one of the most connected airports in the world,” Lorenzo-Redondo says.

As other versions of the virus, such as the Delta variant, emerge in the U.S. and around the world, the team will help to monitor their spread in Chicago. As some variants have the potential to transmit infection more easily, cause more severe disease, or be less susceptible to vaccines, it is important to identify and track these infections to help guide clinical and public health responses.

The center is also working to help answer a pressing question on the mind of many Chicago parents as schools prepare to resume in-person instruction in the fall: Is it safe? That project is being led by Larry Kocielek, MD, ’14 GME, assistant professor of Pediatrics in the Division of Infectious Diseases, who has been working with the CPGME team to sequence SARS-CoV-2 samples from children attending school to determine if spread is happening within schools or if children are instead being infected in the community.

As more people in the U.S. and around the world are vaccinated, the team is also looking for potential changes in the virus that might let it evade the immune protection offered by vaccination, Ozer says. This is particularly important because the slow rollout of vaccines around the world and the uneven vaccine coverage in the U.S. has created pockets with high rates of infection — ideal circumstances for the virus to develop new variants.

“It is important for us to continue the SARS-CoV-2 genomic surveillance,” Ozer says. “We are hopefully rounding the corner in the pandemic, but it is certainly not over yet.”

Tackling Future Threats

As the CPGME team continues to monitor the ongoing changes in the SARS-CoV-2 virus, they are already broadening their sights to tackle one of the biggest ongoing challenges in medicine: antimicrobial resistance. Disease-causing bacteria and fungi that have become immune to many currently available medications cause

“It is important for us to continue the SARS-CoV-2 genomic surveillance. We are hopefully rounding the corner in the pandemic, but it is certainly not over yet.”

Egon Ozer, MD, PhD

about 2.8 million hard-to-treat infections and more than 35,000 deaths in the U.S. each year, according to the U.S. Centers for Disease Control and Prevention. This is also a growing global threat, claiming more than 700,000 lives each year — a number that could grow to 10 million people a year by 2050, according to a review commissioned by the United Kingdom.

To help blunt this threat, the team will partner with clinicians and the clinical microbiology laboratory at Northwestern to screen for drug-resistant microbes in its hospitals and the surrounding community, Ozer says.

The hope is to help identify how patients are infected and to develop prevention strategies. For example, in the last decade a fungus called *Candida auris*, which is often resistant to multiple antifungal drugs, has emerged. It can cause life-threatening infections in hospitalized or severely ill patients and is very difficult to treat. The team is using genomics to track these fungi to better understand how they spread in hospitals, how they develop resistance to antimicrobial drugs, and if they are able to share their drug-evading strategies with other organisms.

“We are hoping to better understand the mechanisms of antimicrobial resistance,” Ozer says.

Mehreen Arshad, MBBS, assistant professor of Pediatrics in the Division of Infectious Diseases, is also leading a pilot study funded by the Northwestern Buffett Institute for Global Affairs to develop a way for the CPGME and its partners in Pakistan to share data and specimens of drug-resistant microbes. The goal is to better understand how both local and global factors influence the use of antimicrobial drugs by clinicians and how these behaviors may reduce or contribute to the emergence of drug-resistant organisms.

“Sequencing is one of the very few tools that can powerfully attack the problem of antimicrobial resistance so that we can understand it better and come up with new solutions,” Hultquist says. “Transitioning from our work in viruses to our work on other microbes is going to be really important going forward.” ❖

A CLOSE EYE ON INFECTIOUS DISEASE

From antimicrobial resistance to the quest for a cure to HIV/AIDS, these Feinberg scientists are taking an expansive view of these microscopic pathogens.

Steven Wolinsky, MD, '82 GME, the Samuel Jefferson Sackett Professor of Infectious Diseases, and Karla Satchell, PhD, professor of Microbiology-Immunology and co-director of the Center for Structural Genomics of Infectious Diseases, have spent years studying dangerous pathogens.

Wolinsky's research focuses on the evolutionary mechanisms underlying host-pathogen interactions. Understanding the evolutionary arms race between viruses and the immune system is the best way to identify therapeutic pathways, Wolinsky says.



Karla Satchell, PhD



Steven Wolinsky, MD

“Human and virus populations are constantly under selective pressures to maintain a competitive advantage over one another,” Wolinsky says. “Mutations that alter the genes in host networks involved in viral replication and early immune defense may underlie the lack of viral control in some people and the apparent resistance to infection in others.”

Satchell, on the other hand, focuses on bacteria. Bacteria cause enormous morbidity and mortality every year, and the rise of antimicrobial-resistant

strains threaten to upend hospital care and unleash a new wave of pathogens on the planet.

Satchell investigates secreted protein toxins, which are released during infection to damage host cells. Satchell's research delves into their contribution to infection in cholera, seafood-associated septicemia, and necrotizing fasciitis. Recently, Satchell investigated the structure of SARS-CoV-2, searching for weak spots in the virus' armor.

“Microbes manipulate our cells in many fascinating ways to block our defense systems so the infection can take hold,” says Satchell, who is also a member of the Robert H. Lurie Comprehensive Cancer Center of Northwestern University. “Our work on how toxins of bacteria accomplish infection helped us understand how SARS-CoV-2 also circumvents our defense strategies, as the experimental techniques and concepts are similar.”

By Cheryl SooHoo

For Every Man

Northwestern investigators make critical impact on prostate cancer research and care.

Prostate cancer remains persistently common — second only to skin cancer — for American men. One in eight men in the United States will face a prostate cancer diagnosis in his lifetime, and more Black men disproportionately develop and die from the disease than white men. While many patients with this typically slow-growing disease can live many years, prostate cancer still kills some 33,000 each year.

“The mortality rate has actually declined in the past decade due to the gains we’ve made in diagnosis and treatment,” says Edward Schaeffer, MD, PhD, chair of the Department of Urology, the Edmund Andrews Professor of Urology, and director of the Polsky Urologic Cancer Institute of the Robert H. Lurie Comprehensive Cancer Center of Northwestern University, who credits enhanced screening as well as a plethora of recently FDA-approved prostate cancer drugs.

Pursuing diverse lines of inquiry, Northwestern investigators continue to make new discoveries that offer promise for more effective therapies. From teasing out the biological and social determinants of health disparities to developing the first precision medicine treatment, clinicians and scientists from the Lurie Cancer Center are dramatically changing the landscape for all men with prostate cancer.

UNDERSTANDING RACIAL DISPARITIES

Even with recent progress, Black men and men of African ancestry in the United States have a 1.8-fold increased risk of receiving a prostate cancer diagnosis compared to white men — and men of other races. And the disease is 2.5 times deadlier for African Americans. Fifteen years ago, Schaeffer began investigating this complex disparity on a molecular level when he noted poorer outcomes for some of his African American patients. More specifically, he says, “Black men with prostate cancer often had more aggressive cancers and experienced disease recurrence more frequently than other patients.”

No single reason accounts for the disproportionate impact of prostate cancer on Black men and in particular, African American men. The goal of better understanding racial disparities has taken the Schaeffer research team down multiple interconnected research paths that meld biological and socioeconomic factors. For example, the group has observed specific gene mutations associated with more aggressive disease progression and anatomic differences in tumors in men of African ancestry. In a 2019 study, the Schaeffer lab found that with similar access to care and standardized treatment, Black men with localized prostate cancer had just as good if not better outcomes than their white counterparts. And earlier this year, a Schaeffer-led group discovered that a

PC-3 human prostate cancer cells, stained with Coomassie blue, under differential interference contrast microscope.

specialized type of immune cell, a plasma B-cell, was present in much higher concentrations in aggressive prostate cancers from Black men. This finding may provide the mechanism for why immunotherapy seems to work better for Black men with advanced prostate cancer than for white men.

In a new study published in the February issue of *Nature Communications*, the investigators analyzed 1,300 tumor samples annotated with self-identified race or genetic ancestry. They found, in general, that tumors from Black men had more plasma cells

The goal of better understanding racial disparities has taken the Schaeffer research team down multiple interconnected research paths that meld biological and socioeconomic factors.

compared to the tumors from white men and that men with enhanced plasma cells had improved cancer survival. The work further suggests that enriched plasma cell content could be a marker for enhanced responsiveness immune-based therapies. Accordingly, testing for plasma cell content in prostate cancer could lead to future immune-based precision medicine treatments for all men with localized aggressive and advanced, lethal prostate cancer.

“T-cells have always been the star child when it comes to immuno-oncology. Only very recently have plasma B-cells taken center stage and become strongly linked to tumor immune responsiveness,” Schaeffer says. “We saw an opportunity to be color blind and

take a deep dive into whether having a lot of plasma cells in prostate cancer had any connection to living longer.”

Building on this work, the Schaeffer team plans to further evaluate the power of plasma cells by developing immunotherapy-focused clinical trials for treating prostate cancer.

FIRST, DO NO HARM

Active surveillance has emerged as a strategy to ensure the best quality of life for men with favorable-risk prostate cancer. While necessary for treating advanced disease, surgery and/or radiation can come with serious side effects such as incontinence, erectile dysfunction, and infertility. For many men, taking a “wait and see” approach is a more palatable alternative for addressing a disease that may never harm them.

Tumor profiling gives useful insight into the aggressiveness of a patient’s cancer by predicting the probability of bad outcomes. Commercial assays such as the Oncotype DX Genomic Prostate Score (GPS) help inform clinical decision-making about active surveillance and other options. Validated in mainly white populations, genomic testing has been shown to increase patient acceptance of active surveillance. Yet in a 70 percent Black population, tumor profiling had a dampening effect, according to a new study conducted by Adam Murphy, MD, MBA, assistant professor of Urology and Preventive Medicine and a member of the Lurie Cancer Center, in collaboration with University of Illinois investigator Peter Gann, MD, ScD.

In one study, part of a larger trial called “Engaging Newly Diagnosed Men About Cancer Treatment Options (ENACT),” investigators recruited 200 men from three public Chicago hospitals. Participants fell into the category of very low to low-intermediate prostate ▶

Edward Schaeffer, MD, PhD



BY THE NUMBERS

1 in 8

men in the United States will be diagnosed with prostate cancer.

33,000

people are killed by prostate cancer each year.

1.8x

increased risk among Black men and men of African ancestry in the United States of receiving a prostate cancer diagnosis compared to white men and men of other races.

2.5x

deadlier for African Americans.



Ashley Ross, MD, PhD

Advances in Screening

cancer risk, which made them good candidates for active surveillance. Interestingly, the scientists found that low-literacy patients were less likely to choose this treatment option when presented with risk data about their tumor. While 88 percent of participants who didn't receive tumor profiling opted for active surveillance, only 77 percent who received GPS results chose active surveillance. Additionally, men with low health literacy were more than seven times less inclined to accept active surveillance compared to those with high health literacy.

"Low literacy's impact was unexpected," says Murphy, who believes that fear of any cancer may persuade some patients to rid their body of the disease as soon as possible despite the consequences. "The finding indicates that medical practitioners need to do a better job of counseling patients about their options so they can make informed decisions."

Published in the April issue of the *Journal of Clinical Oncology*, the study

Introduced in the late 1980s, prostate-specific antigen (PSA) screening helped detect prostate cancers earlier and in their most curable stages. But by the early 1990s, widespread PSA testing became controversial. The lack of specificity of PSA and frequent use of prostate biopsy led to over-detection, especially of lower-risk disease that was often over-treated. In too many cases, men needlessly suffered treatment side effects such as incontinence and sexual dysfunction. Today, screening has evolved a great deal, according to Ashley Ross, MD, PhD, associate professor of Urology. He discusses the latest approaches to prostate cancer screening to ensure the "cure is not worse than the disease."

Why is PSA testing still important?

It narrows the field of who is at risk. PSA screening still serves as a reasonable first step toward a potential prostate cancer diagnosis. A high PSA number doesn't automatically mean a man has prostate cancer. It could be he has an enlarged prostate or infection. Even if cancer cells are present, men often have indolent, nonlethal disease. Because some prostate cancers can progress slowly, the decision to treat in men with limited life expectancy is nuanced.

How has a tiered approach improved screening and diagnosis?

Over the last two decades, we've developed a variety of more sophisticated

urine, blood, and imaging tests that are more accurate than PSA. For example, use of an additional serum test, like the Prostate Health Index (PHI), can help guide detection of important prostate cancers while avoiding unnecessary biopsies. Imaging with multi-parametric MRI can not only provide information regarding the risk of cancer presence but also its location. At Northwestern, we often use a tiered approach: an abnormal PSA test leads to a PHI score, which, if abnormal, is followed by magnetic resonance imaging and then a decision regarding biopsy. Elevated PSA no longer equals biopsy.

What does the future hold?

A key goal of screening remains reducing avoidable biopsies, while identifying clinically significant cancers early when they are most curable. Prostate cancer has been shown to have a large genetic component. Northwestern scientists and others around the world have begun investigating the utility of polygenetic risk scores — looking at hundreds of genes — in prostate cancer screening. Still to be evaluated in clinical studies, this new tool could allow us to more accurately predict men at increased risk of prostate cancer. It could aid us in promoting screening while also identifying those men — a segment of the population — for whom we can take a relaxed or no prostate cancer screening approach.

also detailed two other strong predictors of accepting active surveillance: a family history of prostate cancer and insurance coverage. “A social determinant of health, insurance makes it easier for patients to comply with ongoing PSA testing, prostate exams, and biopsies that are all a part of active surveillance,” Murphy says.

MORE PRECISE TREATMENT

Patients with cancers of the breast, ovaries, lung, and pancreas have benefited from innovative therapies that precisely target specific genetic mutations. Not so for prostate cancer, an equally common cancer — until now. Last fall, Maha Hussain, MBChB, deputy director of the Lurie Cancer Center and the Genevieve

Ground-breaking results showed for the first time that genetically-targeted treatment can extend the lives of men with metastatic prostate cancer that has spread to the bone and elsewhere despite other previous therapies.

E. Teuton Professor of Medicine in the Division of Hematology and Oncology, along with international collaborators, reported ground-breaking results from the PROfound phase III clinical trial in the *New England Journal of Medicine*. They showed for the first time that genetically-targeted treatment can extend the lives of men with metastatic prostate cancer that has spread to the bone and elsewhere despite other previous therapies.

The team, led by Hussain, who is also principal investigator of Lurie Cancer Center’s Specialized Program of Research Excellence (SPORE) in prostate cancer, evaluated the drug Olaparib, already FDA-approved for the treatment of breast, ovarian, and pancreatic cancers. The drug works by blocking PARP, a protein that cancer cells use to repair their damaged DNA. Without PARP, the cancer cells die. Investigators found that Olaparib, a PARP inhibitor, extended the lives of men with

metastatic, hormone-resistant prostate cancer. The clinical trial preselected participants based on their specific genetic mutations that result in defects in DNA repair. These alterations are most commonly found in the BRCA 1, BRCA 2, and ATM genes, says Hussain, co-principal investigator of the PROfound trial. “Our finding opens the door much wider to ushering in a new era of better personalized therapies and precision medicine for prostate cancer,” she says.

Another important, more early-stage discovery has been made by Sarki Abdulkadir, MD, PhD, the John T. Grayhack, MD, Professor of Urological Research and vice chair for research in the Department of Urology. In work published in *Cancer Cell*, Abdulkadir and colleagues describe a new strategy to slow treatment-resistant prostate cancer by suppressing the elusive MYC oncogene, which, he says, has been deemed “undruggable.”

Inhibiting an epigenetic regulator called DOT1L reduced growth of human prostate tumor cells while sparing healthy cells, says Abdulkadir, who was senior author of a study published in *Nature Communications* last fall and is, along with Hussain, principal investigator of the SPORE in prostate cancer at the Lurie Cancer Center, recently renewed by the National Cancer Institute.

“This could be really good for patients with treatment-resistant prostate cancer,” Abdulkadir says.

“We have entered a ‘new world order’ in the care of advanced prostate cancer,” Hussain says. “I am delighted that we continue to make major steps in impacting this cancer. Investment in research, not wishful thinking, is what will cure cancer. Critical to that is the partnership with patients and their families to achieve the ultimate goal.” ❖



Maha Hussain, MBChB



Adam Murphy, MD, MBA



Sarki Abdulkadir, MD, PhD

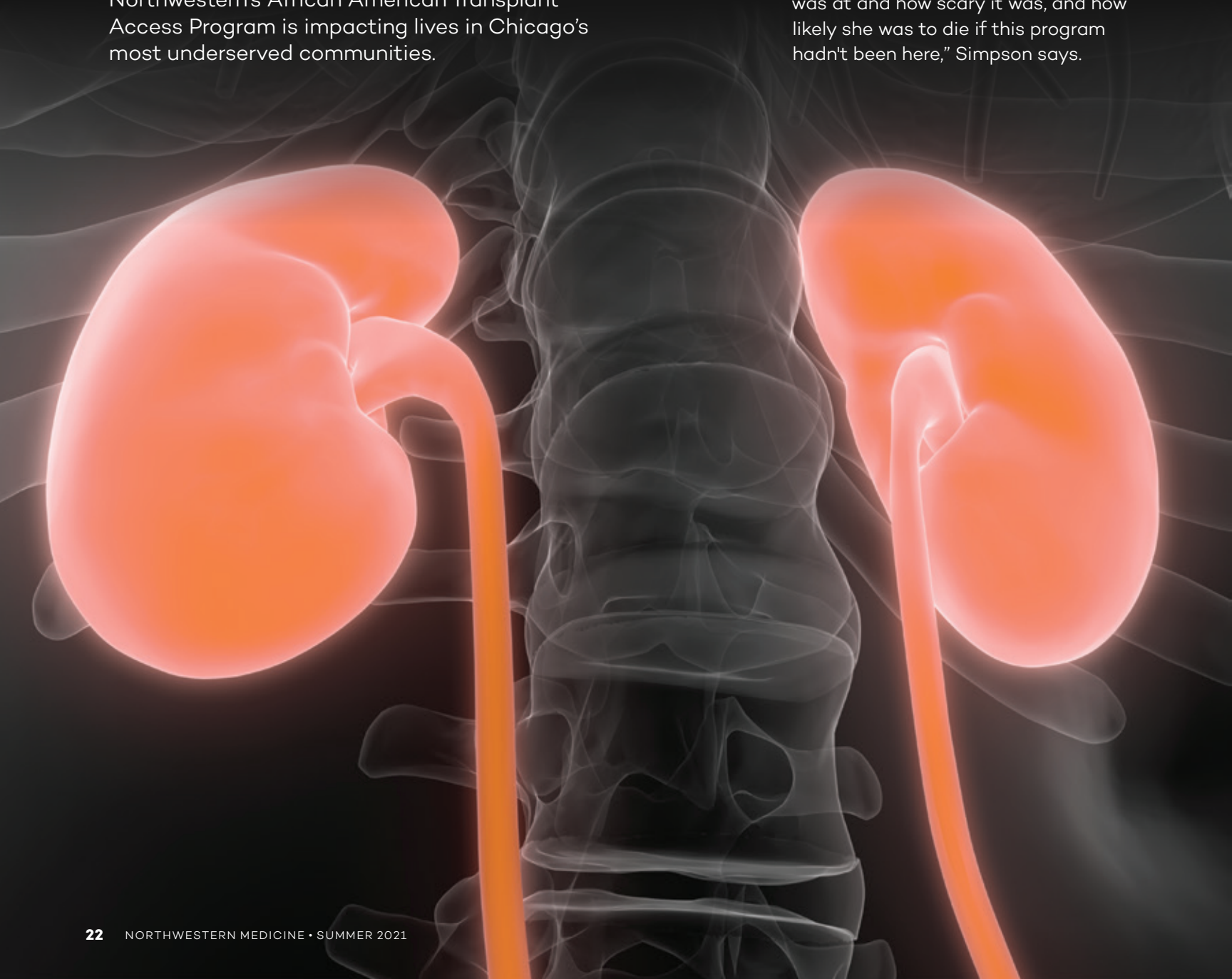
By Christina Frank

REACHING FURTHER

Northwestern's African American Transplant Access Program is impacting lives in Chicago's most underserved communities.

Every year, Dineen Simpson, MD, assistant professor of Surgery in the Division of Organ Transplantation and the only Black female transplant surgeon at Northwestern Memorial Hospital, gets a text from the daughter of a patient who received a liver transplant through Northwestern's African American Transplant Access Program (AATAP).

"She messages me every year on her mother's transplant anniversary to say they are reminded of where she was at and how scary it was, and how likely she was to die if this program hadn't been here," Simpson says.



Simpson is the first and only Black female transplant surgeon in Illinois, and one of only 11 in the U.S. She is working to address a life-threatening situation in Black communities: distrust of the healthcare system.

“There’s a really good reason for this distrust,” Simpson says. “We have a long history in this country of the mistreatment of Black patients, as well as certain myths that get passed down within the community.”

Kidney diseases in particular are a leading cause of death among African Americans. While genetics plays a role, factors like limited access to healthy food and medical specialists in underserved neighborhoods drive up the already high rates of diabetes and hypertension — both major factors in kidney disease. Black patients are about 25 percent more likely to die from liver-related disease compared to non-Hispanic white patients and four times less likely to receive a liver transplant, according to recent research done at Northwestern.

In response, Northwestern Medicine has made it a priority to address the pressing issue of health equity, in both diseases of the liver and the kidney.

“One of the most urgent national and global issues in nephrology, and medicine

more generally, is health injustice,” says Susan Quaggin, MD, director of the Feinberg Cardiovascular and Renal Research Institute and chief of Nephrology and Hypertension in the Department of Medicine. “If we are to achieve kidney health equity and equal access to the best treatment for all patients, we must develop new approaches to healthcare and innovative programs led by talented and visionary leaders.”

With these goals in mind, Northwestern recruited Simpson to develop the AATAP, aimed at addressing the needs of African Americans in underserved communities. She began building the program in 2018 and it was officially launched in 2019. Recently, Simpson hired a dedicated social worker and opened a satellite clinic in Oak Lawn, a suburb on the South Side of Chicago.

“One of the most urgent national and global issues in nephrology is health injustice.”

SUSAN QUAGGIN, MD



Above: Simpson in a patient consultation. Above right: NBC News recently aired a segment about the AATAP, interviewing Chicagoan Dawn Bowen, who is awaiting a new kidney. “It’s a blessing that Dr. Simpson has created this program to target our community and to let us know that she’s there,” she shared with *Northwestern Medicine*.



“The location was very strategic,” she says. “It’s where Black communities tend to be clustered, but the main reason is ease of access, which is one of the barriers that communities of color face.”

Having the satellite clinic helps offset travel logistics and costs involved in coming to the downtown location. “Patients still need to come to Northwestern Memorial when it comes time for transplant and for follow-up, but for that

initial intake visit it’s really been fantastic for the patients in the vicinity to go to the Oak Lawn location.”

Meeting Demand While Addressing Practical Matters

The demand for the program has been overwhelming. In just under two years, the AATAP has arranged for 14 transplants, seen a 55 percent increase in evaluations of Black ▶

patients at Northwestern, and an 18 percent increase in Black patients on the transplant waiting list. (Currently, 80 percent of patients are candidates for kidney transplants and 20 percent for liver transplants.) The team has just onboarded a health literacy coach and hopes to add more dedicated health providers eventually.

As part of a related initiative, Simpson, Northwestern University, and AATAP are partnering with the Endeleo Institute, a non-profit member organization of the Trinity United Church of Christ, focused on creating a culture of health in Chicago's Washington Heights neighborhood. Endeleo has recently

established a food pantry in the neighborhood and the project plans to add nutrition programming, support groups, and educational resources to help guide community members in making better food choices that can help improve disease, with a specific focus on kidney disease.

Navigating the many aspects of psychosocial support can also be especially daunting for Black transplant candidates. This is where AATAP's social worker Shimere Harrington, LCSW, steps in and helps patients secure insurance coverage as well as understand and find the financial resources they need to offset the costs of immunosuppressive medications required after transplant surgery.

Another challenge is lining up in-person care once the patient is back home. A prerequisite for any organ transplant candidate to get on the waiting list is for them to identify people who

can be with them 24 hours a day for anywhere from two to six weeks post-transplant. Patients in economically disadvantaged situations are often less likely to have friends or loved ones who can take time off from their jobs to help out.

Simpson had one patient who was at risk of being denied a transplant because she was unable to arrange the home care she needed. AATAP was able to patch together a non-traditional form of support by reaching out to the members of the patient's church as well as locate resources for hired nursing care.

"It was also important to help the transplant committee reset their expectations around what we think a support network should look like," says Simpson, who refers to this piece of AATAP's intervention goals as "cultural competency" on the part of healthcare providers who may not be familiar with the circumstances or culture in Black communities.



Top: Linda Humphrey-Morgan received a kidney donated by her daughter, who desperately wanted to see her mother survive diabetes. Bottom: Simpson in a consultation.

"It was important to help the transplant committee reset their expectations around what we think a support network should look like."

DINEE SIMPSON, MD



Addressing a Systemic Problem

Simpson stresses that while it's very exciting to see AATAP making a difference on a community level, this is just the tip of the iceberg. "The reason that we have a need for programs like this is because of structural and institutional issues that are at the base of the iceberg. We have a beautifully diverse city, but it's segregated. And in these communities of color, there are few resources," she says.

"So, we are just treating symptoms of a much larger systemic problem that needs to change. AATAP is not going to ultimately fix the problem. We need to make sure that we're paying attention to the bigger structural issues. There needs to be some policy change. There needs to be addressing of these larger systemic issues."

Past negative experiences with the health system may haunt some patients and contribute to their skepticism when faced with a potentially life-threatening diagnosis. Originally, the patient whose daughter regularly texts Simpson on her mother's transplant anniversary staunchly refused to consider a transplant because she was convinced it was an experimental treatment, Simpson recalls.

"I spent hours with this woman over a number of days," Simpson says. "And through that time, I earned her trust. There are a number of papers in the literature about studies on distrust and on patient experience. And one thing that they've noted is that in these situations being the same race as the provider can build trust."

The team also prioritizes patient-centered communication in which they use layman's terms to explain medical conditions and procedures and avoid speaking over the patient.

"We had a lot of family meetings where we came together as a group to let this woman know that her family loved her," Simpson says. "They wanted her to be around. Everybody was scared to death at the thought of losing her."

Thanks to the AATAP, the patient is now doing well, according to Simpson. Meanwhile, the transplant team continues to do everything they can to help others like this patient every day. ♦



Quaggin leads the Northwestern University George M. O'Brien Kidney Research Core Center (NU GoKidney).

At the Forefront of Kidney Care

Under Quaggin's leadership, the Northwestern University George M. O'Brien Kidney Research Core Center (NU GoKidney) is dedicated to ensuring that potential therapeutic targets for kidney diseases are identified, tested in preclinical studies, and advanced to first-in-human clinical trials.

A major breakthrough in recent years has been the ability to grow tiny kidneys in a dish. Quaggin says such organs could be developed from human skin cells or cells from a person's urine. Others across the world are growing such organs, but Quaggin and her team are using genome editing technology to understand and ultimately grow blood vessels for these kidneys, a missing piece of the bioengineered puzzle, which will allow the kidney to be "hooked up to the rest of the body," Quaggin explains.

The kidney division at Northwestern has also been part of several recent clinical trials studying the kidney-protective effects of SGLT2 inhibitors (a class of prescription medicines that are FDA-approved for use with diet and exercise to protect the kidneys and hearts of adults with Type 2 diabetes) in patients with and without diabetes. In fact, these

therapies received breakthrough status at the FDA, which is rare, according to Quaggin.

Joseph Leventhal, MD, interim chief of Organ Transplantation in the Department of Surgery, has focused his research on eliminating the need for immunosuppressants in kidney transplant patients. The procedure, called tolerance induction, involves therapeutic cell transfer, in which stem cells from the donor are also transplanted into the recipient.

"We currently have the world's largest experience of successfully taking living donor kidney transplant recipients entirely off immunosuppression medications through the use of combined kidney and stem cell transplant for mismatched donor and recipient pairs," he says.

This new treatment creates a situation where the new immune system does not see the organs as different, Leventhal explains. "We have been able to get close to 30 patients off immunosuppression using this approach. And we now have five patients who have been off immunosuppression for more than 10 years."



New assistant dean
for medical education
Linda Suleiman, MD,
weaves health equity into
her curriculum goals and
her own career as an
orthopaedic surgeon.

PASSION FOR EQUITY

By Bridget Kuehn
Photography by
Teresa Crawford

Linda Suleiman, MD, '17 GME, is one of just six Black female surgeons in the country specialty-trained to perform joint replacements. This fact is not lost on her patients, many of whom are Black women who travel miles, including from out of state, to be cared for by a surgeon who looks like them. Some have even been turned down by local surgeons who fail to offer surgery due to medical complexities or comorbidities. Suleiman advocates giving everyone a fair shot at restored functionality.

“There is huge need and underutilization of joint replacements in patients of color nationally,” Suleiman says. Many patients are from at-risk communities where medical comorbidities are common. Some find it difficult to get transportation to and from surgery, or physical therapy during recovery. “We as physicians often forget about social vulnerability and the social determinants of health.”

But Suleiman, who is director of Diversity and Inclusion for the McGaw Medical Center of Northwestern University and who was named assistant dean of Medical Education last summer, plans to change that by developing curricula and learning experiences for residents and fellows that help them consider risk and social factors contributing to health outcomes and disparities.

“We aren’t just talking about pathophysiology or the operative technique of surgery, but about the patient — who they are and where they are from,” says Suleiman, who is also an assistant professor of Orthopaedic Surgery and of Medical Education.

Inclusive Education

Suleiman draws from personal experience in this new role, which also includes creating an inclusive environment for trainees. She grew up in Hamilton, Ontario, and was inspired to become a physician by her mother, who was an anesthesiologist in Mogadishu, Somalia. To escape the civil war there, the family emigrated to Canada, where Suleiman’s mother was unable to practice medicine, but found other ways to contribute to her community through working for government agencies. Her mother’s sacrifices made Suleiman all the more determined to pursue a career in medicine.

When Suleiman was a medical student at Howard University, people questioned her interest in surgery, she says, because women and Black surgeons were — and still are — so underrepresented in the field. The peer support she received during her residency from the Northwestern McGaw Underrepresented Residents and Fellows Forum enabled her to persist on her path to orthopaedic surgery when other friends and colleagues did not.

“We as physicians often forget about social vulnerability and the social determinants of health.”

LINDA SULEIMAN, MD



Top: Suleiman in the operating room. Bottom: Suleiman at a Northwestern Medicine mentoring event. She is committed to inspiring young women to explore orthopaedics as a career path.

“Where I found the real pull was that feeling of belonging, whether it’s in your specialty or at your institution,” she says.

Suleiman didn’t have a faculty leader devoted to creating a welcoming environment for trainees — as she is now — when she was going through training. But she was honored to return to Northwestern in 2018 as the first African American woman faculty member in the Department of Orthopaedic Surgery and as director of diversity and inclusion for graduate medical education.

“It really felt like home to me because of the peer network and the support,” she says. “I felt honored to be able to come back as an orthopaedic surgeon and serve in this leadership role as someone who can help make sure residents and fellows from underrepresented groups in medicine feel a sense of belonging here at Northwestern.”

In her ongoing role as director of diversity and inclusion, Suleiman has focused on recruiting medical students, residents, and fellows from underrepresented groups. To help them succeed and thrive at Northwestern, she expanded beyond peer-support to include faculty support and mentoring and has created personal and professional development opportunities. When she started as director, approximately 14 percent of graduate medical trainees were from underrepresented groups. Now, just three years later, nearly one-quarter of the incoming class in residency and fellowship are from populations underrepresented in medicine. ►

“We did a really nice job of making sure that we were reaching out and mentoring medical students from across the country to attract them to come and serve patients in Chicago,” she says.

Building Health Equity

The growing ranks of physicians-in-training from diverse backgrounds are essential to Northwestern’s mission of improving health equity. Building a curriculum that helps physicians provide the best care possible to all patients across the Chicagoland area is just as important.

“Individuals from diverse backgrounds bring different perspectives to our field,” Suleiman says. “Whether in orthopaedic surgery or any other specialty, different perspectives help us understand patients from diverse backgrounds.”

But for trainees to thrive there must be a safe learning environment regardless of the trainee’s gender, sexuality, race, or ethnicity, Suleiman says. This led her to help launch an inclusive and bias-free curriculum for the medical campus.

She also helped launch McGaw Medical Center’s first Health Equity Week this past spring. More than 500 people, including trainees, physicians, students, and hospital employees, registered for the event. Experts from across the country delivered talks on topics including health equity

“Where I found the real pull was that feeling of belonging, whether it’s in your specialty or at your institution.”

LINDA SULEIMAN, MD



for LGBTQ communities, the impact of endometrial cancer and maternal health disparities on Black women, and the need to build a stronger pipeline of diverse students. For many of the trainees, it was their first time hearing about some of these sensitive topics, according to Suleiman. “It’s really to help them better understand our patients,” she says.

Suleiman’s own research on disparities in hip and knee replacement — and how policy decisions contribute to them — have inspired her to build trainees’ awareness of what they can do to ensure that all patients get optimal care. In a study published in the *Journal of Arthroplasty*, Suleiman found that Black patients often wait longer for surgery for degenerative joint disease despite presenting with worse osteoarthritis. Another study, which she co-authored, showed that policies aimed at reducing payer costs for hip and knee replacements may make it more difficult for some patients to access care.

“My goal is to make sure our trainees understand what the social determinants of health are and how they affect the practice of medicine,” she says.

Paving the Way

In addition to helping boost representation among trainees at Northwestern, Suleiman is also committed to helping boost the ranks of women in her specialty. Her research has shown that orthopaedic surgery lags behind other specialties in representation of women. During the 2016–2017 academic year, women made up just 14 percent of residents in the specialty and 6 percent of all practicing orthopaedic surgeons. Because there are so few women in the field, it can be hard for female medical students to picture themselves as an orthopaedic surgeon, she explains.

“Orthopaedics is a physically demanding specialty,” she says. “The myth is that women cannot handle it. But it is really about technique and not brute strength.”

Suleiman believes that strategic planning at the national and institutional levels is needed to help recruit more women and individuals who are underrepresented to the field. Early in her career, Suleiman was an intern at one such program, Nth Dimensions, which works with academic institutions, industry, and surgeons to develop a diverse pipeline of surgeons. Last year, Suleiman was part of an event at Northwestern hosted in conjunction with the Perry Initiative to introduce female medical students and local high school students to orthopaedics and engineering.

Suleiman’s dual roles as a surgeon and as an educator enable her to both share her passion for the field and change lives for the better in the operating room.

“I love operating and being able to help patients who came in with debilitating musculoskeletal problems get back to being active, pain-free, happy, and able to do what they want to do independently,” she says. ❖

Suleiman, with her husband Quentin Youmans, MD, chief fellow in cardiology. They have a daughter, Yara, who is almost two years old.



Overcoming the Pebbles

A letter from Edward S. Kim, '92 BS, '96 MD (HPME)

“It isn't the mountains ahead to climb that wear you out; it's the pebble in your shoe.”

These words by Muhammad Ali have resonated with me throughout my career. For me, they express the importance of defining what the goal or “mountain” is and, equally important, identifying the “pebble,” or reason why we don't achieve it. Understanding why we don't follow through — why we don't scale the mountain — helps us learn.

As an oncologist, I have spent over 20 years conducting clinical trials for patients in the hopes of helping treat or prevent cancer. The mountain is increasing the number of effective treatments that will extend life or lead to a cure. Completing enrollment to clinical trials will speed drug development and lead to answers. So why has this been so slow? Identifying the pebbles is important.

One of the biggest challenges for clinical trials has been accruing patients. This doesn't appear to make much sense, as there are many patients affected by cancer and not enough clinical trials to adequately enroll them. As of now, 5 to 8 percent of patients will be eligible for a clinical trial. Many reasons are offered to account for poor trial accrual, including the number of studies (too low—need to open more) or access (people in rural areas are too far away from large academic centers). However, in my opinion, the pebble is clinical trial eligibility criteria.

When reading a clinical trial protocol, the median number of eligibility criteria is more than 30. This means that a patient needs to qualify for each one of these criteria in order to enroll in a study. The advantage of having a more homogenous study population is to reduce the number of variables between subjects, so

that one can adequately conclude that a given experimental treatment indeed demonstrates a benefit or lack of benefit. A more heterogeneous population could blur the study conclusions.

I believe clinical studies should enroll patients who are representative of the population. Working through the American Society of Clinical Oncology and Friends of Cancer Research, we have published a series of manuscripts outlining changes to eligibility criteria that follow the science and rationale of a study, without interfering with potential results.

When we started this project, many pebbles were brought to our attention and many we experienced first-hand. With the mountain identified as speeding clinical trial completion through enrollment, identifying the correct pebbles allowed us to focus. Many investigators (including myself) have complained about the complexity and number of eligibility criteria and their downstream consequences: more paperwork, more personnel needed, more time, slower accrual, patients not being screened due to most not being eligible. The recommendations we published have led to progress. In 2019, the National Cancer Institute changed the protocol template to reduce the number of eligibility criteria and the FDA issued inclusivity guidance documents. Research needs to be more inclusive; this will lead to fewer pebbles and more results — which may indeed accelerate important treatments for patients.

A recent example is our COVID-19 vaccines. These drugs went from laboratory to clinical trials incredibly quickly. Enrollment was brisk,

and we now have several vaccines available. However, there was delay in reporting safety for those age 12–15 years as well as people who had cancer. These groups were excluded from the initial studies, and it is unclear why. One will always cite safety, but these groups will routinely get influenza vaccines. Eligibility criteria excluded these groups, perhaps based on an excess of caution.

Just as inclusivity is critical in clinical trial research, it is essential for our medical community to embrace the principle of

inclusion as a foundational element. The medical alumni association has created the Inclusion and Allyship committee, whose mission it is to unite and support the alumni community and current students at Northwestern University Feinberg School of Medicine “who represent diverse experiences of ethnicity, gender, sexual orientation, religion, age, socioeconomic status, and/or physical ability.”

This work cannot be accomplished unless we rely on and get help from one another. Time and time again throughout history, the biggest successes are achieved when we work with our allies. Showing support and extending your hand as an ally to people of all backgrounds and lifestyles can lead to even greater potential.

I would ask that we all keep aiming for the mountain, but be mindful of pebbles, and not let them stop us from achieving our goals.

“Time and time again throughout history, the biggest successes are achieved when we work with our allies.”

References: Kim ES, Bruinooge SS, Roberts S et al. “Broadening Eligibility Criteria to Make Clinical Trials More Representative: American Society of Clinical Oncology and Friends of Cancer Research Joint Research Statement.” *J Clin Oncol*. 2017

David Rhew, '92 MD, has spent his career exploring the intersection of medicine, technology, and innovation.

OPEN MINDED

During his quarter-century career as a physician, health services researcher, and medical information technology executive, David Rhew, '92 MD, has often found himself asking the questions, "What if?" and "How?"

What if combining technology with healthcare could lead to transformative changes in how care is delivered? What if providing the right information at the right time could improve decision-making and outcomes across the care continuum? What if artificial intelligence (AI) could enable proactive care and lead to lower costs?

All are questions Rhew, global chief medical officer (CMO) and vice president of healthcare for worldwide commercial business at Microsoft Corporation, has pondered and acted upon.

In 2013, when Rhew became CMO at Samsung SDS America, where he spent six years before joining Microsoft, the role did not exist.

"Samsung asked me, 'What should your title be?'" he recalls. "At the time, the concept of a chief medical officer working for a consumer technology company was novel. But I knew that healthcare was moving toward consumer-empowered care and that consumer technologies could become a central platform for data communications."

Now, as CMO at Microsoft (where he has been for the past two years) Rhew — who trained in infectious diseases at UCLA Medical Center — has been focused on applying technology solutions to address the COVID-19 pandemic.

He had been with Microsoft for about a year when the pandemic hit, and because of his background as an infectious disease physician, combined with his desire to help, he readily accepted the role of international coordinator for Microsoft's COVID-19 Task Force. Together with colleagues and partners, Rhew helped the World Health Organization develop what it calls "the world's first comprehensive, end-to-end data solution for global health: The World Health Data Hub."

Rhew and partners have aided countries, states, and healthcare organizations across the globe to increase their pace of COVID-19 vaccinations by setting up mass vaccination clinics and pop-up clinics. Currently, Rhew is exploring ways to address vaccination inequities and rebuild public health infrastructure through public-private partnerships to help manage the current pandemic and prevent future ones.

AN EARLY INTEREST IN HEALTHCARE AND TECHNOLOGY

Rhew's interest in technology stretches all the way back to his days as an undergraduate

studying cellular molecular biology and computer science at University of Michigan, where he wrote a thesis on the use of AI in healthcare.

"I wrote what my advisors at the time called some really interesting science fiction," says Rhew, who now holds six U.S. technology patents that marry clinical decision support and electronic health records. "There was not a whole concept of electronic health records in the 1980s, let alone using artificial intelligence."

Most people, including family, friends, and counselors, did not see how technology could be applied to Rhew's future career in medicine. "At the time, I did not see how it could fit in either," Rhew admits. "I studied computer science and performed health services research mostly out of curiosity. I wanted to learn how to code video games. I also wanted to understand why there was so much variation in care and explore ways to reduce unwarranted variation. I never anticipated that studying computer science and conducting health services research would end up becoming two of the most integral parts of my life and career."



PROGRESS NOTES

*We'd love to hear from you!
Please share your recent
news, accomplishments, and
important milestones with us.*



Send your updates and
high-resolution photos to
medcommunications@northwestern.edu.

We will publish them in an upcoming
issue of the magazine.

1950s

Gerson Bernhard, '53 MD, '59 GME, has become used to video medicine precepting rheumatology fellows at University of California San Francisco and consulting with primary care physicians in Medicaid and free clinics through the MAVEN Project during the pandemic. Bernhard remarks, "While this is mutually useful, it is not the same as being in the same room with the patient to examine them and catch the nuances of the interchange."

Jerrold J. Weinstock, '59 MD, has practiced psychiatry for more than 50 years in Key West, Florida, where he set up all mental health services clinics covering all of Monroe County from the 1960s through the 1990s and has served as a consultant to school systems. He has also become an environmental activist, writing a book: a 16-year project titled "Insult to Our Planet & the Florida Keys," available on Amazon. The book has been described as "nature writing that is absorbing and even poetic."



Tim Herrick, '83 MD, pictured with Kate Brown, governor of Oregon, when she received the Johnson & Johnson COVID-19 vaccine at a rural clinic where Herrick was volunteering.

1960s

John J. Beck, '65 MD, retired from his full-time practice in family medicine on December 31, 2008 and part-time correctional medicine on October 31, 2013. He and his wife, Barbara, recently moved back home from assisted living. They look forward to gardening and maintaining their hiking trails. In his spare time, Beck also teaches adult education classes on a variety of topics. 📷 1

Trent W. Nichols, '69 MD, '76, '78 GME, has become chief medical officer for the International Cancer Alliance for Research and Education (ICARE). Following the death of his wife Sharon Ann from a rare form of endometrial cancer, carcinosarcoma, his family founded the Sharon Ann Nichols Foundation for Endometrial Cancer, which is affiliated with ICARE and is working to change the standard of care by promoting tumor banking for chemotherapy and immune therapy testing via organoid or mouse model.

Nichols also shared that the clinical trial of photobiomodulation with NIR LED light he conducted with colleagues Marvin Berman and Jason Huang has achieved statistical significance in executive functioning and clock drawing in 106 subjects in an IRB-placebo-controlled clinical trial in Alzheimer's and Parkinson's dementia at Baylor Scott White and Quietmind Foundation in Elkins Park.

1970s

Jason Chao, '79 MD, FAAFP, is a graduate of the Honors Program in Medical Education and professor of Family Medicine and Community Health at Case Western Reserve University and University Hospitals Cleveland Medical Center. Chao is a co-author of the study "Contributions

JASON CHAO, '79 MD, FAACP, CO-AUTHORED THE STUDY "CONTRIBUTIONS OF U.S. MEDICAL SCHOOLS TO PRIMARY CARE" WHICH HAS BEEN RECOGNIZED FOR THE 2020 RESEARCH PAPER OF THE YEAR AWARD BY THE SOCIETY OF TEACHERS OF FAMILY MEDICINE.

Inclusion and Allyship: Sharing Stories

"During our third year of medical school, two of my classmates and I elected to study abroad for one quarter. One chose Vietnam (during the war) serving in a clinic for indigenous Montagnard people caught between the warring factions. Another chose a mission clinic in Thailand. I chose Zululand, South Africa, to work in a British hospital for the indigenous Zulu people. We participated in hospital care, surgery, delivery of babies under C-section (malnutrition made vaginal delivery life-threatening), and outreach clinics for Zulu people living in the wilderness. This was my first experience with community medicine.

Upon returning to medical school in Chicago, we noticed there were many similarly disadvantaged people in low-income communities of color around us, and we decided to organize a free clinic. We approached the Erie Neighborhood Center for social services in a low-income, largely Hispanic and Black neighborhood. The staff agreed that a clinic would be beneficial, as long as we were qualified. We gathered support from classmates, residents, and faculty members who volunteered along with us. Students appreciated clinical experience and people in the community came in significant numbers to seek help. Later, I spent a year as a fellow in Community Medicine at Presbyterian St. Luke's Hospital (now Rush Medical College) and then worked in the second largest federally funded community health center in Tucson, Arizona.

Twenty years later, at a Board Meeting of Physicians for Social Responsibility in Washington, D.C., I met the medical director of the third largest federally funded community health center in the nation — the Erie Community Health Center in Chicago! My colleague wasn't aware of the history of the clinic's origins, so I sent him the clinic's charter from our medical school days. We each can be innovators of social change!"

— *Barbara H. Warren, '67 MD, MPH*



We would love to hear your stories of Inclusion and Allyship. Please submit your story by emailing gina.bazer@northwestern.edu.

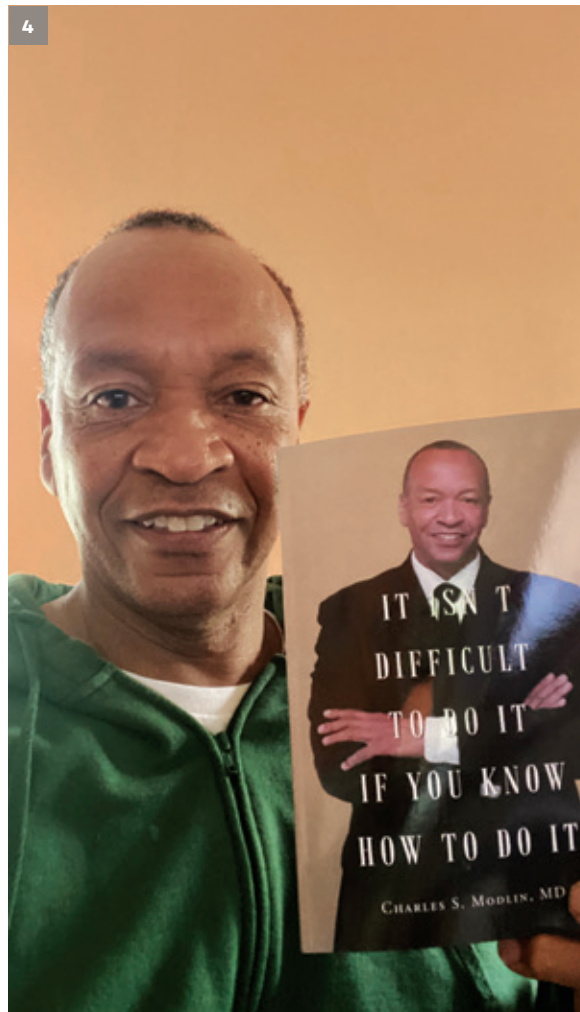
of U.S. Medical Schools to Primary Care (2003–2014): Determining and Predicting Who Really Goes into Primary Care," published in the journal *Family Medicine*. The Society of Teachers of Family Medicine (STFM) recognized this publication for the 2020 STFM Research Paper of the Year Award. STFM is a national community of academic leaders committed to developing an accomplished family medicine workforce prepared to serve as the foundation of America's healthcare system.

Robert Buckingham, '79 MD, FACP, married his wife, Kate, on September 17, 2019 in Odessa, Ukraine. Buckingham remains in full-time medical practice and is just completing his fifth book, "How Dancing Really Stops the Clock." His book focuses on the mechanics of the capillary cell pivot and swing dance step rhythm between outer membrane permeability and mitochondrial combustion. He writes: "For the rhythm to be effective, it must be timely and counterbalanced in its signaling, metabolic, and purpose execution. When the dance step rhythm is robust, it will clarify a precision and timely execution of capillary cell multipurpose that will include the resuscitation of its infrastructure (as well as that of its interstitial space allied partners), the maintenance of interstitial space

SCOTT SARRAN, '79 MD, '92 MBA, IS THE FOUNDING CHIEF MEDICAL OFFICER AT MORECARE ILLINOIS, A START-UP GROUP THAT FOCUSES ON THE HIGHEST RISK POPULATIONS WITHIN COOK COUNTY.

hygiene, and optimization of end organ cell functional health and longevity. In this manner, the capillary and downstream endothelial cell dance step rhythms become the major quality assurance mechanic behind the antagonism of aging and subsequent end organ disease prevention.” 📷 2

Scott Sarraan, '79 MD, '92 MBA, is the founding chief medical officer at MoreCare Illinois, a start-up group of Medicare Advantage Plans with a focus on the highest-risk populations within Cook County (institutionalized, institutional-eligible, and HIV-positive beneficiaries). Scott continues to swim, run, and bicycle, and enjoys spending time with his four grandsons.



1980s

Tim Herrick, '83 MD 📷 3, and *Joan Burlingham Herrick, '82 BSPT*, have spent the last nine years in Portland, Oregon, where Tim has been practicing ambulatory and hospital family medicine, and teaching students and residents at Oregon Health & Science University. He also started a travel medicine clinic and a Hepatitis C treatment clinic at his family medicine center. Joan retired from physical therapy on their return from Africa and has been mentoring international students and their spouses. Both Tim and Joan are now learning Arabic in preparation for their move to Mauritania this

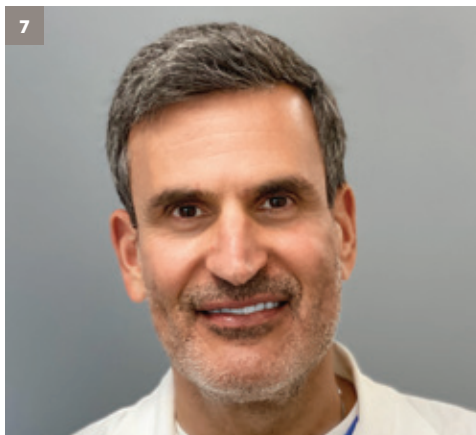
fall, to help promote family medicine practice and training within the country's context.

Harry E. Wilkins, III, '86 MD (HPME), '93 GME, released a book co-authored with Hedi Aguilar, RN, founder and CEO of Fundamental Roots, titled “The Art of Effective Communication.” In addition, Wilkins retired from active clinical practice as a trauma surgeon on staff at Blessing Hospital in Quincy, Illinois, to become president and CEO of Gift of Hope Organ & Tissue Donor Network, based in Itasca, Illinois. In this role, he is responsible for the leadership and oversight of a 330-employee organization that covers 180 hospitals and 10 transplant centers in Illinois and part of Northwest Indiana, and was responsible for the recovery of 457 organ donors in 2020. Gift of Hope Organ & Tissue Donor Network is one of 57 federally designated organ procurement organizations responsible

for coordinating all aspects of organ and tissue donation.

Jennifer I. Lim, '86 MD, '87 GME, was a recipient of the 2020 Women in Ophthalmology Scientific Contribution Award, which recognizes a physician or non-physician scientist who has made a significant scientific contribution in the field of ophthalmology. Lim also was named the recipient of the 2021 Macula Society Paul Henkind Memorial Award and gave the Henkind Lecture virtually on February 6. She is the Marion H. Schenk Esq., Chair in Ophthalmology for Research in the Aging Eye, professor of Ophthalmology, director of Retina Service, and vice chair for Diversity and Inclusion at University of Illinois at Chicago. 📷 5

Charles Modlin, Jr., '87 MD, MBA, is the author of the book “It Isn't Difficult to Do It If You Know



Shirley Chi '01 MD, '02 GME (second from left), a Los Angeles-based dermatologist, was featured as the expert in a new documentary short film, "In the Sun," which "lets viewers in on the personal skin health journeys of seven families as they navigate the long-term effects of living in the sun while still living vibrant lives."

How to Do It," which centers on youth mentorship, guidelines for a college education and beyond, and success strategies for overcoming challenges and achieving goals. Modlin draws from his own childhood experiences through medical school and his career as a kidney transplant surgeon. 📺 4

1990s

Harold N. Keer, '90 MD, '90 PhD, was appointed chief medical officer at Astex Pharmaceuticals in November 2020. During the pandemic, the company announced that its novel oral drug treatment for myelodysplastic syndromes, ASTX727, was approved by the Federal Drug Administration. During this time, Keer also became a grandfather. With vaccines

available, Keer has volunteered with San Mateo County, administering shots or giving medical consults — his contribution toward ending the COVID-19 pandemic. 📺 6

Steven Covici, '93 MD, FACS, has a private practice where he specializes in oculofacial plastic and reconstructive surgery in Springfield, Massachusetts. Covici is also chief in the Division of Ophthalmology at Baystate Medical Center. 📺 7

Erik K. Alexander, '97 MD, was appointed vice president of education for Brigham and Women's Hospital, overseeing undergraduate and graduate medical education and allied health educational activities for more than 3,000 trainees. He serves as the associate dean for medical education at Harvard Medical School. 📺 8

William W. Ting, '99 MD, '99 MBA, writes:

"We are honored to announce the endowment of the William W. Ting, MD, and Flora H. Ting Family Scholarship at Feinberg and pleased to announce Rohail Memon (Class of 2024), as the inaugural scholar this academic year. We hope to inspire the Feinberg Classes of '98 and '99 to join our commitment to supporting scholarship efforts to make Feinberg medical education tuition-free one day."

2000s

Shirley Chi '01 MD, '02 GME, a Los Angeles-based dermatologist, was featured as the expert in a new documentary short film, "In the Sun," executive-produced by Kerry Washington with Neutrogena Studios. According to publicity

In Memoriam

Northwestern Medicine expresses its condolences to the families and friends of the following alumni (listed in order of their graduation year) and faculty who have passed away. All dates are in 2021 unless specified below.

ALUMNI

Donald L. Custis, '43 MD
Savannah, Georgia
MARCH 18

Frances Friend Coburn, '47 MS, '50 PhD
Lafayette, California
APRIL 1

Richard A. Davis, '51 MD, '56 MS, '59 GME
Villanova, Pennsylvania
MAY 7

Victor M. Bernhard, '51 MD, '59 GME
Port Charlotte, Florida
JULY 21, 2020

Warren E. Meyer, '51 MD
Wichita, Kansas
APRIL 1

John C. Buckingham, '52 MD
Phoenix, Arizona
MARCH 1

Jack L.F. Westover, '53 DDS
Aurora, Colorado
MAY 5

Samuel S. Koide, '53 MD, '54 MS, '58 GME, '60 PhD
Dobbs Ferry, New York
APRIL 2

William E. Lloyd, '53 MD
Colorado Springs, Colorado
APRIL 14

Mary Jane Wagstaff, '54 MD
Olney, Maryland
MAY 4

Josephine C. Tolomeo, '55 BSDH
Mundelein, Illinois
MAY 4

Juan L. Hutchings, '55 DDS
South Jordan, Utah
MARCH 29

Victor T. Carnelli, '56 DDS
Chicago, Illinois
APRIL 1

Ronald G. Custis, '59 DDS
Dubois, Wyoming
FEBRUARY 17

Dorothy Porter, '60 BSN
Moss Point, Mississippi
MARCH 1

Ronald C. Winslow, '60 MD
Lexington, South Carolina
JANUARY 1

Morrison S. McDavid, '62 MD
Santa Barbara, California
MARCH 29

Robert D. Hazen, '64 DDS
Bountiful, Utah
APRIL 30

Harry K. Genant, '67 MD, '68 GME
Napa, California
JANUARY 14

Irwin S. Feldman, '67 MS, DDS
Potomac, Maryland
MAY 1

Gregory J. Schade, '68 DDS, '73 MS
Boise, Idaho
MAY 2

James B. Curtis, '68 DDS
Logandale, Nevada
FEBRUARY 28

Victor L. Lewis, Jr., '68 MD, '77 GME
Chicago, Illinois
MARCH 2

Jeffrey D. Beckwith, '71 MD
Springfield, Oregon
APRIL 1

Henry R. Gross, '75 MD
Peoria, Illinois
FEBRUARY 8

Thomas B. Krull, '84 DDS
Orland Park, Illinois
FEBRUARY 26

Mark A. Andregg, '95 MS, DDS
Tulsa, Oklahoma
APRIL 23

Jay Cole, '97 DDS, '99 GME
Cheyenne, Wyoming
MAY 18



Richard A. Davis, '51 MD, '56 MS
Villanova, Pennsylvania
JUNE 15, 1925 – MAY 7, 2021

Richard Davis, '51 MD, '56 MS, demanded much of himself and others in the pursuit of superb patient care, devotion to teaching, and excellence in neuroscience research. It was just as his father and teacher, Dr. Loyal Davis, chair of the

Department of Surgery from 1933 to 1963, had encouraged him to do. In fact, after completing his medical degree at Northwestern University medical school in 1951 and earning a master's in anatomy in 1956, Dr. Davis was appointed the Kanavel Fellow during his six-year residency in neurosurgery under the direction of his father.

Later, Dr. Davis' neurosurgical career would span 30 years at the University of Pennsylvania, its hospital, and medical school. At Penn, Dr. Davis organized a research laboratory to investigate central nervous system control of gastric secretion and its relationship to peptic ulcer disease. His findings anticipated surgical innovations for neurologically-based ulcers, and he was awarded one of the very first NIH research grants investigating these relationships.

Dr. Davis taught and led by example. In addition to his rigorous insistence on clinical precision, he will be remembered for his compassion and kindness, including discouraging the dehumanizing connotations of the word "case" when referring to his patients.

During the 1980s, former first lady Nancy Davis Reagan, Dr. Davis' sister, often played hostess to the Davis family at the White House, and Dr. Davis had a long friendship with President Reagan. Dr. Davis was also an avid golfer and, as his loved ones shared, he "believed the game, like surgery, held special meaning and challenge as a performance for and against himself."

Davis was driven to excellence, but never consumed by its pursuit. He loved his family dearly, just as he loved his chosen profession of medicine. He took pleasure in the goodness he cultivated throughout his lifetime. His legacy continues, both at the University of Pennsylvania and at Northwestern, where the Loyal and Edith Davis Chair in Surgery he helped establish in honor of his father is held.

FACULTY

Izaak "Jack" van Elk, MD
assistant professor emeritus
of Medicine in the Division
of Cardiology
Northbrook, Illinois
DECEMBER 26, 2020

Howard J. Sweeney, '51 MD
associate professor emeritus
of Orthopaedic Surgery
Northbrook, Illinois
MARCH 27

materials, the documentary “lets viewers in on the personal skin health journeys of seven families facing extraordinary circumstances as they navigate the long-term effects of living in the sun while still living vibrant lives.” Its aim is to dispel misconceptions about skin health and provide information about sun safety through “real stories that span across generation, race, and gender.” The film can be viewed on YouTube. 📺 9

Elisa S. Gallo, '01 MD, FAAD, received a Presidential Citation for over a decade of volunteer work nationally and internationally at the annual American Academy of Dermatology meeting this past April. Gallo, currently an associate editor for the *Journal of the American Academy of Dermatology* (JAAD), was also named section editor for the JAAD podcast, “Dialogues in Dermatology,” which provides continuing medical education to 20,000 members nationally and internationally. 📺 10

Ankur Jain, '02 MD (HPME), completed a residency in Internal Medicine in 2005 at Loma Linda University Medical Center, where he was selected as chief resident. Jain subsequently completed a fellowship in Gastroenterology at Kaiser Permanente Medical Center in Los Angeles in 2009. After working for several years in Southern California, Jain moved back to Hawaii in 2013 and started a gastroenterology practice with his wife, who is also a gastroenterologist. He has a special interest in colorectal screening and is a member of the state colorectal cancer task force. Jain has also been serving as the governor of Hawaii for

WITH RETIREMENT, COVID-19 CAME, GIVING SCOTT HENDERSON, MD, '77 MS, '86 GME, A CHANCE TO VOLUNTEER AT A MEDICAL RESERVE CORP VACCINATION CLINIC.



the American College of Gastroenterology since 2017 and is an associate professor of Medicine at the John A. Burns School of Medicine. 📺 11

Shamila G. Rawal, '02 MD, joined Haute Beauty Network as a hair restoration expert. Rawal's practice, The Rawal Institute for Hair Restoration and Aesthetic Medicine, is located in Madison, Wisconsin. Rawal is an otolaryngologist/head and neck surgeon, specializing in the management of hair loss and rejuvenation of the face and neck. 📺 12

MS/GME

Scott Henderson, MD, '77 MS, '86 GME, retired January 2020 after 33 years of practice with Midwest Physicians Anesthesia Services in Columbus, Ohio. During his years in Columbus, he served in various leadership

positions, including two years as chair in the Department of Anesthesiology and as section head for Obstetrical Anesthesia at Riverside Methodist Hospital for about 20 years. With retirement, COVID-19 came, giving Henderson a chance to volunteer at the Medical Reserve Corp in Franklin County vaccination clinic.

PT

Kyle Fahey, '15 DPT, was named the recipient the Emerging Leader award from the Illinois Physical Therapy Association on March 6. In November 2020, Fahey co-authored the book “Adaptive Yoga: Designed for a Variety of Bodies and Conditions,” which was written to educate and inspire yoga instructors and medical professionals to utilize yoga in the care of individuals with disabilities and chronic health conditions. 📺 13

Donors Support Their Passions, Make Marks in Medicine

Generous donors contribute to the medical school in a wide variety of areas that are important to them personally. These gifts often provide crucial seed funding that allows Feinberg physicians, scientists, and educators to build new programs, explore novel ideas, and build applications for larger grants from federal institutions like the National Institutes of Health and other organizations.



Bernard and Barbro Osher during a reception at Northwestern in 2015. Photo by Randy Belice

OSHER FOUNDATION INVESTS IN FUTURE INTEGRATIVE MEDICINE LEADERSHIP

Adding to its storied history of philanthropy promoting health and well-being at Northwestern and across the world, The Bernard Osher Foundation has made a new \$2 million commitment to the Osher Center for Integrative Medicine at Northwestern University.

The gift builds on a multimillion dollar endowment established by the foundation in 2014 that named the Osher Center and enabled it to flourish over the last six years. The additional funding will support training for the next generation of leaders in integrative medicine, which recognizes that health is a state of well-being in body, mind, and spirit, reflecting aspects of the individual, community, and population.

“The Oshers have been visionary in the field of integrative medicine and certainly for us

here at Northwestern,” said Melinda Ring, MD, executive director of the Osher Center and clinical associate professor of Medicine and Medical Social Sciences. “Their support has made it possible for us to bring integrative medicine to health professionals, patients, and our community, and has furthered our mission to transform healthcare more broadly.”

The Osher Foundation was founded in 1977 by Bernard Osher, a respected businessman and community leader. The foundation seeks to improve quality of life by supporting higher education and the arts.

What is Integrative Medicine?

Integrative Medicine reaffirms the importance of the relationship between practitioner and patient, focuses on the whole person, is informed by evidence, and makes use of all appropriate therapeutic approaches, healthcare professionals, and professions to achieve optimal health and healing.

“We are pleased to augment our endowment support for Northwestern’s Osher Center and wish our colleagues continued success with their important work in advancing the field of integrative medicine,” said Osher Foundation president Mary G. F. Bitterman.

The new gift will allow Northwestern’s Osher Center to nurture promising early career clinicians, educators, and investigators. It will provide these junior team members with stipends and grants to learn new skills or to pursue teaching, research, and community engagement opportunities with protected time and mentorship.

“Thanks to the wonderful generosity of the Osher Foundation, our philanthropic advisory council, and many generous friends of the center, we continue to grow our team, our programs, and our impact,” said Ring. “We’ve made immense progress and have many exciting ideas we hope to see come to fruition with ongoing support.”

Flanagan (far right) with her lab team and Melin-Rogovin (second from right), who established the Mark Rogovin Pilot Research Award in Neuroscience in honor of her late husband.

ROGOVIN AWARD SUPPORTS PILOT RESEARCH ON FRONTOTEMPORAL DEMENTIA

To honor her late husband and spur much-needed new research exploring memory and dementia, Feinberg donor and staff member Michelle Melin-Rogovin established the Mark Rogovin Pilot Research Award in Neuroscience. Margaret Flanagan, MD, was selected as the inaugural recipient earlier this year.

What is Pilot Research?

Pilot research is small-scale research conducted to gather preliminary data or to demonstrate the feasibility of a study before seeking larger sustained funding to pursue the research at full-scale.

which has primarily focused on Alzheimer's disease, and apply it to FTD."

Administered by the Northwestern University Clinical and Translational Sciences (NUCATS) Institute, the award requires recipients to demonstrate how their pilot research activities will contribute directly to a planned future submission for research funding from the National Institutes of Health.

"Pilot grants play a crucial role in scientific discovery, often providing rapid, targeted funding to address small but critical gaps in clinical and translational science," explained Richard D'Aquila, MD, NUCATS director, associate vice president of Research, senior associate dean for Clinical and Translational Research, and the Howard Taylor Ricketts, MD, Professor of Medicine.

"It's truly an honor to be able to conduct frontotemporal degeneration (FTD) focused research in memory of Mark Rogovin," said Flanagan, assistant professor of Pathology. "It's going to be very exciting to take our research progress,

Mark Rogovin brought his artistic vision to the West Side of Chicago, when in 1972 he founded the Public Art Workshop, a community art and mural center that allowed for children in the Austin neighborhood to receive free art education after school. He also co-founded the Peace Museum in 1981. Rogovin died of frontotemporal dementia in September 2019.

"Combining the essence of who my husband was — his creativity as an artist, and the curiosity scientists possess to ask new questions to advance human health — I knew I wanted to fund a pilot grant in Mark's memory and that NUCATS could help," said Melin-Rogovin, senior associate director of foundation relations in Feinberg's Development and Alumni Relations Office. "Today when someone is diagnosed with frontotemporal dementia, they are offered comfort, care, and support. We need to generate new ideas, a lot of them. Funding small

grants like this holds the potential to lead to that next a-ha moment."

Flanagan's lab explores the role of TDP43, a disease-causing protein in the brain, and its effect on neuroinflammation that ultimately results in dementia.

"This is a particularly meaningful award to me because of the backstory that accompanies it," said Flanagan. "I lost my father to Alzheimer's disease in 2012 and learning about others who have shared experiences inspires me both personally and professionally."



Mark Rogovin and young artists working on a mural through his Public Art Workshop in 1979.

A CAREER IN NEUROLOGY

When Sandra Olson '63 MD, '69 GME, started at Northwestern's medical school in 1959, there were four women in her class of 140. This was not unusual; only 5 percent of medical students in the U.S. were women at the time. She went on to achieve many firsts for a woman in medicine — the first to be president of a list of organizations (including the Chicago Medical Society, Chicago Neurological Society, and the Illinois State Medical Society) and the first woman chief of staff at Northwestern Memorial

It was never my ambition to be president of X, Y, or Z. I took opportunities when they came along.

Hospital. But Olson never liked focusing too much on the “first woman” aspect.

“I was in the right place at the right time,” says Olson,

who is professor emeritus in the Ken and Ruth Davee Department of Neurology. “It was never my ambition to be president of X, Y, or Z. I took opportunities when they came along. It turned out I enjoyed the leadership positions, and I had a proclivity for that aspect of medicine.”

Recently, Olson looked back on her long career and answered some questions.

When did you know that you wanted to be a neurologist?

My interest was piqued during a first-year course in neuroanatomy. We had a session when the professor brought in a patient with Friedreich's ataxia, a genetic neurodegenerative disorder, and I found it extremely intriguing.

Is there a common attribute that you find among neurologists?

We need to be patient. This is because you don't see immediate changes in people. For example, a surgeon goes in and fixes a heart

and that person is better almost right away. That doesn't happen a lot in our field. It can take a long time to see a real change in a person's disease.

What do you love most about the field?

You get to help people, even though you can't necessarily “cure” the disease. You help them deal with it and work with them to sustain and even improve their quality of life with all the measures at your disposal.

What are some patient stories that have stayed with you all these years?

There are many, but some of them are rather depressing. I remember the 27-year-old, when you had to turn the respirator off. I remember the young woman who had a brain tumor and I was outside the angiogram room with her husband and two children, and I knew what the answer was, and it was bad. Those occasions tear you up. But, there is one happy story that I've never forgotten. And that's a lady who had a pretty mild multiple sclerosis (MS) that came on after she had a baby, which happens. I had seen her early on in my career and I followed her for many years and, fortunately, she was stable all that time. Finally, I said to her one day, “You know, you're so stable, I don't think you really have to come back on a regular basis,” and she said, “No, I want to continue to come back and see you and be told that nothing has changed.” That was fine with me. But I still remember the joy in telling her, “You don't have to come back.”

What are some notable advancements in your field that you witnessed over the course of your career?

There are so many new medications and treatments in the armamentarium now.



When I first came out of medical school, we treated MS with steroids. There was a protocol with steroids for 10 days and then a taper. Now you have all these immunotherapies — there are more than a dozen immune-modulating therapies that slow disease progression. Same with migraines — there used to be little to offer the many women who came to see me who were debilitated by the headaches. Then, Imitrex changed everything, and now there are so many other options, too.

What do you say to people interested in pursuing a career in neurology?

One in six people will either have a neurological problem or have a close relative with a neurological problem — so there is a need for what we do. But you have to really be patient, like neurology, and be willing to put in the time. Because there are few dramatic fixes in our field.

Top: McNealy speaks at the dedication of Wesley Memorial Hospital in 1941. The hospital was located at 250 E. Superior Street, the site of Prentice Women's Hospital today.

Right: A collage that was part of an article about the Department of Visual Education in a 1944 issue of the medical school's *Quarterly Bulletin*.

Below: A still from one of the newly digitized films shows McNealy demonstrating how to repair an inguinal hernia.



1942-1953

Lights, Camera, Medical Education

GALTER LIBRARY FILM PROJECT PRESERVES MEDICAL HISTORY

A gift from the family of Raymond McNealy, MD, a leading surgeon in the first half of the 20th century and chief of Surgery at Wesley Memorial Hospital (a predecessor to Northwestern Memorial Hospital), has enabled Feinberg's Galter Health Sciences Library & Learning Center to restore teaching films that show the evolution of surgical techniques — and Northwestern's early role in the use of film in medical education.

With the McNealys' grant, Galter Library was able to digitize films spanning from 1942 to 1953. They show McNealy demonstrating a cardiectomy to treat a bullet wound to the right ventricle, as well as how to repair hernias, remove the spleen, and more.

The McNealys' early investment in the surgical films boosted Galter Library's successful application for additional funding to digitize its collection of medical education on film from 1929-1959. Galter Library received a grant for that project through the Council on Library and Information Resources Recordings at Risk program, which is funded by The Andrew W. Mellon Foundation.

"My hope is that these films, and those with other physicians, will serve as both a record and an encouragement for physicians and historians," shared Roderick McNealy, Raymond McNealy's son. "From a purely selfish perspective, these films make it possible to see my father 'live' again. From a professional perspective, it would be fascinating for current physicians and students to compare medical techniques and thinking over the years. I like to think that this is, in fact, early 'virtual' training."

"Through the McNealys' gift, we are now able to preserve and openly share this unique aspect of Northwestern's history as a hub of educational innovation," said Kristi Holmes, PhD, director of Galter Library and professor of Preventive Medicine and Medical Education.

"Galter's collection of 16mm films, once digitized, will be one of the very few medical motion picture collections available online and will offer scholars a rare look at medical filmmaking, educational film, medical imagery, midcentury medical education, and more," shared Katie Lattal, special collections librarian at Galter Library.

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