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NYU Langone  
Hospital—Brooklyn

## **Building One of the City's Safest Hospitals**

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From the Lab

## **How We Lost Our Tails**

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NYU Langone Hospital—  
Long Island

## **An Ace Trauma Team Restores Hope after Tragedy**

PAGE 34

# **Bam!**

## **This Kid Has Heart.**

**MAZ ZISAN** LANDS A KNOCKOUT PUNCH AGAINST A FATAL HEART CONDITION, THANKS TO THE NEW PEDIATRIC HEART TRANSPLANT PROGRAM AT HASSENFELD CHILDREN'S HOSPITAL.

PAGE 26



Complex Cases

# His Aorta Verged on Rupture. What Happened Next Will Astonish You.

**Dr. Aubrey Galloway, codirector of the Center for Complex Aortic Disease, likened the eight-hour operation to repair Lionel Warren's aorta to "jumping out of an airplane, having someone throw a parachute to you, grabbing it, putting it on, and opening it before hitting the ground."**

AT AGE 63, Lionel Warren had never been so busy. He worked 12-hour days as a production manager for a manufacturing plant in New Jersey. In his off hours, he hit the gym or spent time with his girlfriend, Petericia. He tended to dismiss the day-to-day aches and pains. He even pushed past occasional chest pains. But when a painful lump the size of a softball emerged at the base of his neck in September 2019, he knew it was time to see a doctor.

In the exam room of Aubrey Galloway, MD, Warren's mysterious lump pulsed like a balloon being squeezed and released rhythmically. Even Dr. Galloway, an internationally renowned cardiothoracic surgeon who'd built his reputation on tackling the toughest cases, was astonished by the mass. "Wow, that's your aorta that you are feeling, there in your neck," he recalled saying to Warren. "It could have burst at any moment." Dr. Galloway recommended surgery right away.

Warren had faced down emergency surgery four years earlier after suffering a tear of the inner wall of the upper section of the aorta, the body's main artery. The condition, linked to uncontrolled high blood pressure and most common among men around his age, causes blood to flow between the wall's layers, forcing them apart. If left untreated, the wall can fatally rupture. Aortic tears like Warren's cause 15,000 deaths annually.

A surgeon at a New Jersey hospital had replaced the damaged section with a polyester tube but not without


complications: heavy bleeding forced doctors to keep Warren's chest open postsurgery, and subsequent infections led to a three-month hospital stay, including a lengthy stretch on a ventilator. "They almost lost me twice," says Warren.

Warren's recovery was long, but he eventually regained his stamina. Then the thumping softball appeared. His cardiac surgeon in New Jersey examined the scan and then said, "Go to Dr. Galloway. He's the best. You'll be in good hands."

Repairs of the upper section of the aorta are extremely complex, requiring advanced surgical expertise and strong collaboration between cardiothoracic and vascular surgeons. NYU Langone offers precisely that: Dr. Galloway, along with his clinical partner, vascular surgeon Thomas Maldonado, MD, codirects the Center for Complex Aortic Disease, among the busiest of its kind in New York City. They lead a team of doctors, researchers, and fellows who meet regularly to plan procedures and ensure the best possible outcomes for their patients.

It's a model that routinely attracts daunting cases, but Warren's would push the boundaries. His aortic wall had weakened at the original surgical repair area, causing blood to pool in a pouch, a condition known as a pseudoaneurysm. The probable cause was an infection of his prior graft, which would have to be removed as well. Repairing it would require a lifesaving procedure so complex and risky that most medical centers would refuse to attempt it.



A close-up portrait of Lionel Warren, a middle-aged Black man with a white goatee and glasses, wearing a blue polo shirt and a black baseball cap with white lettering. He is smiling slightly and looking off-camera to the right. The background is a soft, out-of-focus light color.

Lionel Warren survived two potentially fatal tears in his aortic wall, thanks to the expertise of surgeons at the Center for Complex Aortic Disease.



Dr. Aubrey Galloway (left) performed an eight-hour operation to repair a pseudoaneurysm on the aorta of Lionel Warren (center) that could have ruptured at any moment. Dr. Thomas Maldonado (right) then repaired an aortic aneurysm using a minimally invasive approach, inserting a stent graft to reinforce the aorta while maintaining blood flow to the rest of the body.

Dr. Galloway's team dove in. On October 8, 2019, they embarked on an ambitious surgical plan. Since it would be virtually impossible to keep the engorged mass from bursting during the surgery, blood flow would have to be stopped temporarily. The eight-hour operation began by lowering Warren's body temperature to 63°F and packing his head in ice to prevent brain damage. After repairing the torn aorta, Dr. Galloway removed the infected graft from the previous surgery and replaced the aorta from the heart up to the blood vessels leading to the head and arms. This cleared the path for Dr. Maldonado, a nationally recognized expert in minimally invasive techniques, who planned to repair a second aneurysm in the upper left chest after Warren had recovered from the surgery. Dr. Galloway likened the operation to "jumping out of an airplane, having someone throw a parachute to you, grabbing it, putting it on, and opening it before hitting the ground."

Nine months later, Dr. Maldonado tagged in to finish the repairs. First, he completed an open bypass, connecting two arteries between the neck and the left arm to ensure healthy blood flow following the subsequent aneurysm repair. Two days later, he performed minimally invasive endovascular surgery, threading a catheter through Warren's femoral artery and, using X-ray guidance, navigating to the damaged area of the aortic wall. There, he inserted a fabric-and-metal device called a stent graft to seal it off. Warren was discharged a few days later. "Together, Dr. Galloway and I were able to repair something that seemed almost unfixable, using a combination of techniques," says Dr. Maldonado.

With a now-healthy aorta and a new lease on life, Warren is back to his robust schedule: working, walking two to three miles a day, doing pushups. "The doctors say I've got to 100 now," he says, "and I don't want to miss out on anything."



TO FIND A DOCTOR WHO TREATS AORTIC DISEASE, VISIT [NYULANGONE.ORG/COMPLEXAORTICDISEASE](http://NYULANGONE.ORG/COMPLEXAORTICDISEASE), OR CALL 212-263-2620.



## Timeline

# Reconstructing Lionel

## HOW SURGEONS AT NYU LANGONE REPAIRED A BADLY DAMAGED HEART OVER THE COURSE OF A YEAR

Lionel Warren's care at the Center for Complex Aortic Disease underscores the importance of entrusting cardiac and vascular repairs to surgeons who possess the skill and the experience to handle the most challenging cases. Here's how he was saved by Aubrey Galloway, MD, and Thomas Maldonado, MD, who codirect the Center for Complex Aortic Disease.

09 • 30 • 2019

### THE DIAGNOSIS

Warren is referred by his initial surgeon to Dr. Galloway, who sees the huge lump in Warren's neck and recognizes it as a blood-filled pouch, called a pseudoaneurysm, that has developed along the original suture repair of his ascending aorta. "It's rare to have these grow large enough to see them externally," says Dr. Galloway. "Often, they just tear loose, and the patient dies suddenly." He recommends immediate surgery. Warren agrees to return a week later.

10 • 08 • 2019

### OPEN HEART SURGERY

NYU Langone performs 1,500 open heart surgeries annually, but few are as intricate as this eight-hour procedure. After Warren is connected to a heart-lung machine, his head is packed in ice until his body temperature cools to 63°F, enabling the team to temporarily stop blood flow without damaging brain function. As expected, the pseudoaneurysm ruptures once Warren's sternum is opened, but the cooling technique stems the blood loss. The bypass pump is turned off. Dr. Galloway and Deane Smith, MD, codirector of the Thoracic Aortic Disease Program, clean out loose blood and clots from the previous surgery. Limited blood flow is restored after 13 minutes. Dr. Galloway removes the infected stent along with scar tissue and diseased sections of the ascending aorta. He disconnects the innominate and left carotid arteries from the arch and reconnects them closer to the heart, enabling Dr. Maldonado to repair a second aneurysm on Warren's upper descending aorta later on. "We created a landing zone to insert a stent graft without covering these vital arteries," says Dr. Galloway. Finally, he connects a replacement graft from the ascending aorta to the arch, completing the repair. Full circulation is resumed, the patient's body temperature is returned to normal, the bypass machine is disconnected, and the chest is closed.

11 • 13 • 2019

### RECOVERY

Warren suffered a minor stroke during the procedure, likely due to the reduced blood flow to the brain. At first, he experiences difficulty speaking and weakness in his hands. As the swelling subsides, he regains full function with the help of the inpatient cardiac and neurocritical care teams. "They did an outstanding job of getting him through a vulnerable phase following the surgery," says Dr. Galloway. Warren heads home. He's scheduled to see Dr. Maldonado in the summer.

07 • 19 • 2020

### BYPASS SURGERY

Warren's aneurysm has grown to nearly a dime in diameter and may rupture within a few years. Repairing it requires two procedures. The first, performed on this day by Dr. Maldonado, involves connecting two arteries to preserve blood flow to the brain and left arm once he repairs the aneurysm two days later. "The aneurysm was in a tough spot," says Dr. Maldonado. "We needed to eliminate the risk of a stroke or other complications."

07 • 21 • 2020

### MINIMALLY INVASIVE REPAIR

NYU Langone has been a pioneer in repairing aortic aneurysms through the blood vessels, known as endovascular surgery, and was among the first to use the technique in the delicate aortic arch area. "Ten years ago, open surgery would have been the only option," says Dr. Maldonado. No longer. He makes a tiny incision in Warren's groin and threads a catheter to the aneurysm, using continuous X-ray guidance from a fluoroscope. Once in place, he deploys the stent graft to reline and seal the aorta. The device, in use for only about six months, is engineered specifically for the arch, conforming to its sharp curvature and reducing the risk of collapse. "It's a big advance for this type of repair," Dr. Maldonado says.

09 • 21 • 2020

### A POSITIVE PROGNOSIS

Two months following Warren's third procedure at NYU Langone, he gets a favorable report: The repairs have healed beautifully, and there is no sign of further dissection. Warren remains on medication to control his blood pressure, but he is otherwise back to normal—and grateful to Dr. Galloway and Dr. Maldonado. "I've got nothing but positive things to say about them," he says. "They're why I'm here today."





Photographs by Jonathan Kozowyk



## Diagnostics

# They Invented a Pathology Lab on Wheels. Can It Revolutionize Brain Surgery?

AN INNOVATION STORY IN TWO PARTS

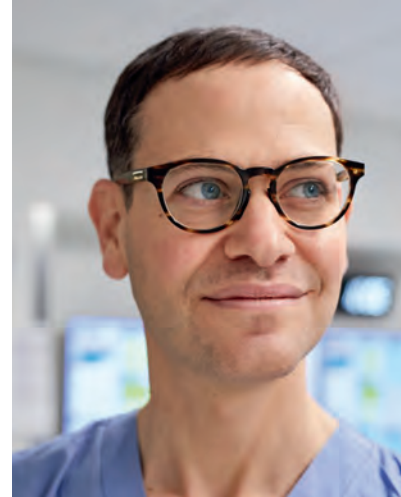


In the OR, neurosurgeon Dr. Daniel Orringer (left) and neuropathologist Dr. Matija Snuderl employ an imaging system they developed that eliminates the time a patient remains on the operating table while surgeons await pathology results, reducing the risk of infection or complications.

## PART 1

### The Neurosurgeon

Dr. Daniel Orringer



OBSERVING HIS FIRST brain surgery as a medical student in 2001, Daniel Orringer, MD, felt two emotions in equal measure: fascination and fear. Before him was a neurosurgeon with full command of his instruments. Dr. Orringer looked on as the physician artfully and methodically worked his way through delicate brain tissue. Yet even this master surgeon could not escape the inevitable moment when he would encounter the borders of the deadly tumor blending into healthy tissue like a patch of watercolor. Save for some form of super, magical vision, it seemed to Dr. Orringer, it would be virtually impossible to know when and where to stop cutting. “I was surprised how much guesswork was required of the surgeon to estimate the boundaries of the tumor,”

recalls Dr. Orringer, who joined NYU Langone Health in 2019 as an associate professor of neurosurgery.

That guesswork defines a central challenge of brain surgery. Cut too little and the residual tumor cells will reboot and kill the patient. Cut too much and critical brain functions could be irreversibly damaged. The dilemma persists even as new technologies have transformed the field of neurosurgery. The advent of magnetic resonance imaging (MRI) in the late 1970s meant tumors could be visualized in advance of an operation; microsurgery has enhanced precision in the operating room; and cancer genetics have improved diagnostics and treatment. Yet, for some of the most common types of brain cancer, such as gliomas, patients fare no better today than they did in the 1970s. While they are diagnosed more accurately and receive better treatments, their long-term survival prospects have hardly budged. Those with the most aggressive cancers, glioblastomas, may not live a year beyond their surgery.

For Dr. Orringer, it seemed clear that those dismal odds would remain unchanged until surgeons had better tools to discern between deadly and healthy tissue in the operating room, while they still had an opportunity to make a difference. “We know that the surgical outcome is one of the most important predictors of patient survival for brain tumor patients,” Dr. Orringer says. “It also happens to be something we can control and improve, unlike how aggressive the tumor is, or what part of the brain is involved.” Indeed, studies show that in up to three-quarters of patients with brain cancer, portions of the tumor that could be safely removed are left behind, simply because the surgeon cannot see them. Without visual certainty, the risk of removing precious healthy tissue that could be involved in speech, memory, movement, or virtually any other important function of the brain is simply too high to cut beyond the known boundaries.

The gravity of the problem put Dr. Orringer on a career-long



**“Although he’s a neurosurgeon and I’m a neuropathologist, we’re both innovators at heart and driven to solve problems.”**

**MATIJA SNUDERL, MD, CLINICAL ASSOCIATE PROFESSOR OF PATHOLOGY AND DIRECTOR OF MOLECULAR PATHOLOGY**

path to find a solution, taking him to physicists and their advanced optics, pathologists and their novel genetic methods, engineers, and artificial intelligence (AI) experts. Eighteen years later, he has played a pivotal role in advancing a radically new kind of imaging system, now employed at the Brain and Spine Tumor Center at NYU Langone’s Perlmutter Cancer Center, that helps brain surgeons cut with more confidence.

It’s called stimulated Raman histology, or SRH, a method that distinguishes tumor regions, rich in protein and DNA, from normal lipid-rich brain tissue, creating contrasted images akin to conventional histology slides. The technology is based on an old technique, Raman spectroscopy, used in chemistry since the 1920s, that involves shining a laser beam at a sample. The unique vibrational properties of different molecules change the optical properties of the laser, helping to create an image of the sample’s structure. While powerful at capturing details at sub-micron resolution, Raman spectroscopy had always been too slow to be of any use in urgent clinical settings. But in 2008, Harvard scientists had made a breakthrough, fortifying the signal over a million times. “Suddenly, instead of taking all day to acquire an image, it could be done at video rate in a fraction of a second with much higher resolution,” Dr. Orringer says.

He set out to adapt the technique for brain tissue.

Since then, Dr. Orringer and team have published a landmark paper in *Nature Biomedical Engineering* showing that pathologists could just as readily distinguish between cancerous and healthy tissue using the SRH images made in the operating room compared to the conventional ones created in the lab. The system works in concert with a powerful new diagnostic technique that leverages AI to distinguish among tumor types in less than 2 minutes, compared to the 20 to 30 minutes it typically takes human pathologists. The speed of diagnosis is a game changer, eliminating the time that a patient remains on the operating table while surgeons await lab results—a dangerous gap that increases the odds of infection or complications.

“If we have a patient with a tumor of unknown etiology, for example, we might not know whether it’s glioblastoma or lymphoma—two tumors with very different treatments,” Dr. Orringer says. “Making the distinction in the operating room is extremely important.”

Housed in a metal box about the size of a minifridge and mounted on wheels, the technology, which is now available to all NYU Langone Health patients with brain tumors, can be rolled into any operating room to provide a surgeon with near real-time analysis of a tissue sample. “Surgical decision-making is like operating brake and gas pedals,” Dr. Orringer says. “We are taking

the guesswork out of the picture by allowing the surgeon to interrogate the tissue on a microscopic level and use imaging data to inform surgical strategy.”

**PART 2**

**The Neuropathologist**

Dr. Matija Snuderl



**BRAIN CANCER IS** a misleading term for what turns out to be a group of more than 120 distinct types of tumors, whose molecular diversity has only recently been recognized thanks to new molecular-profiling technologies. Today, brain tumors are no longer classified based on their histological features alone, but on their molecular signatures, which can determine how the tumors behave. Whether tissue

samples are obtained using SRH or conventional methods, they must be analyzed by a specialized pathologist to determine which treatment approach is best for the tumor. “These images are quite complex,” Dr. Orringer says. For that analysis, he has Matija Snuderl, MD, clinical associate professor of pathology and director of molecular pathology.

The two physicians were connected through a mutual friend in 2014, when Dr. Orringer was looking for a neuropathologist to independently evaluate the clinical value of the early SRH images. “We immediately hit it off,” Dr. Snuderl recalls. “Although he’s a neurosurgeon and I’m a neuropathologist, we’re both innovators at heart and driven to solve problems.”

When Dr. Snuderl entered medical school, he thought he’d become a pediatric cardiac surgeon. “Then I realized that pathologists are actually behind the steering wheel of medicine,” he says. “Surgeons, oncologists, neurologists, they all rely on our diagnosis, and if the diagnosis is incorrect, everything else will be wrong.”

Noting the importance of diagnosing cancers at a molecular level, Dr. Snuderl has been developing novel tests to reveal a tumor’s unique molecular signature. One such test is a brain-cancer-profiling method that goes beyond gene mutations and considers DNA methylation profiles—that is, the epigenetic alterations that can arise from those mutations. This extra layer of information can show how two



60-Second Science

## Brain Implants May Be the Future of Pain Relief

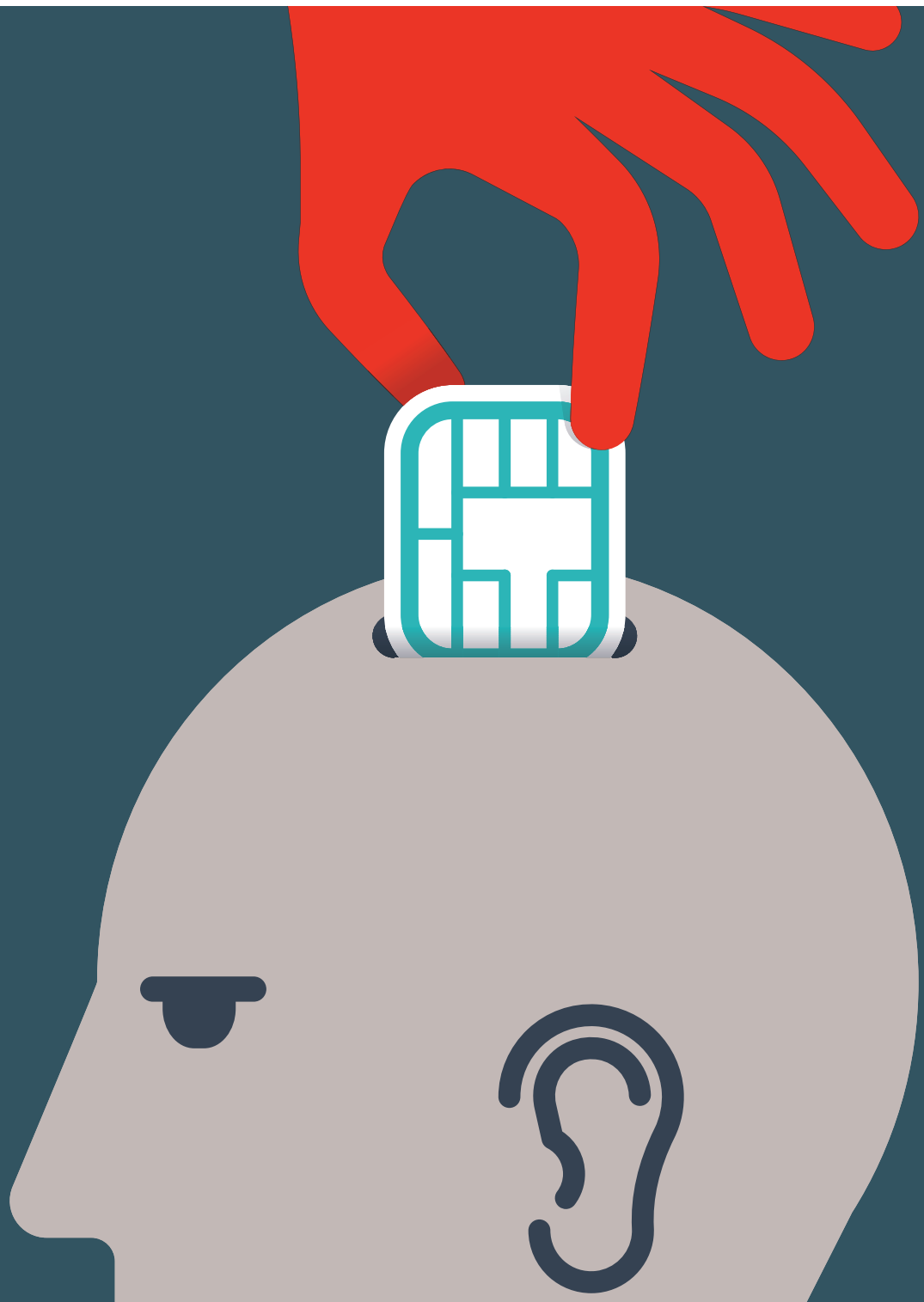
Chronic pain is widespread. So, too, is addiction to pain medications. In search of an alternative to opioids, Jing Wang, MD, PhD, has designed a brain implant to monitor for blunt pain signals. To test the device, Dr. Wang and his colleagues implanted it in rats, targeting regions of the brain associated with pain regulation. One part of the device monitored electrical signals for signs of pain while another part delivered current to disrupt the pain signaling. When the device was activated by a computer, the rats withdrew their paws 40% more slowly from a sudden noxious stimulus than when the device was inactive. The study, published in *Nature Biomedical Engineering*, is the first to test a brain implant that can detect and treat pain in real time. “Our findings show that this implant offers an effective strategy for pain therapy, even in cases where symptoms are traditionally difficult to pinpoint or manage,” says Dr. Wang, director of NYU Langone’s Interdisciplinary Pain Research Program.

tumors that look identical under the microscope may in fact behave quite differently, depending on their environment. How fast a tumor grows or how well it responds to medication could vary significantly, subject to its epigenetic profile, and this, in turn, impacts the neurosurgical approach. “The neurosurgeon can decide to be more or less aggressive based on what we tell them,” he says. For that to actually work, however, the neurosurgeon would need the information during the operation. Molecular tests, though, take two weeks to carry out.

Dr. Snuderl and Dr. Orringer reasoned that they could possibly solve the speed problem by training an AI algorithm to diagnose a tumor based on what it looks like on SRH images taken during surgery. “A real innovation is bringing that diagnostic information to the operating room in real time, where the surgeon can act on it,” Dr. Orringer says.

In a recent study published in *Nature Medicine*, the team tested the AI technology on the 10 most common categories of brain tumors. They trained an algorithm on SRH images of 415 patients with brain cancer and then tested it against expert pathologists evaluating samples from a separate group of 278 patients undergoing surgery. Both the algorithm and neuropathologists correctly diagnosed 94% of the tumors. Notably, the mistakes made by the algorithm and neuropathologists were different. If the methods had been combined, diagnostic accuracy would have approached 100%. “If the algorithm was in the hands of the pathologist, it would have been possible to avoid a single misdiagnosis,” Dr. Orringer says.

“We can essentially deliver the capacity to detect and diagnose brain tumors with accuracy traditionally found only in the most well-resourced centers, and with unprecedented speed,” Dr. Snuderl says. “It stands to reason that, particularly in the management of difficult cases, this will have a big impact on patients.”







The honors keep piling up for **Kathryn Moore, PhD**, who was elected to the National Academy of Sciences and, just months later, was named the American Heart Association's 2021 Distinguished Scientist in Arteriosclerosis, Thrombosis and Vascular Biology.



**Joseph D. Zuckerman, MD**, who has dedicated his career to enhancing the specialty of orthopedic surgery, earned the 2021 William W. Tipton Jr., MD, Leadership Award from the American Academy of Orthopaedic Surgeons—the field's most prestigious honor.



**Victor J. Torres, PhD**, nabbed NYU Langone Health's first MacArthur Fellows "Genius Grant." Dr. Torres is the first microbiologist in five years to earn the prestigious award.



The American College of Rheumatology honored **Gregg Silverman, MD**, as an ACR Master for his contributions to the understanding of the microbiome, and the role of antibodies in autoimmune diseases, including rheumatoid arthritis and lupus. He was also named the Mamdouha S. Bobst Professor of Internal Medicine.



**Jun Wang, PhD**, whose investigations focus on next-generation immunotherapy targets for cancers, won an ASPIRE Award from the Mark Foundation for Cancer Research. Wondering about the acronym? It stands for Accelerat-

# High-Fives, Huzzahs, and Thumbs-Up

## A ROLL CALL OF AWARD WINNERS AND HONOREES



ing Scientific Platforms and Innovative Research.



For leading the first successful pig-to-human kidney transplant (see page 14) and other innovations, such as kidney-paired exchange and the use of hepatitis C–positive organ donors, **Robert Montgomery, MD, DPhil**, chair of surgery and director of the NYU Langone Transplant Institute, was named one of America's 25 Greatest Disruptors by *Newsweek*.



Hematologist and oncologist **Marc J. Braunstein, MD, PhD**, was tapped as a Hero in Healthcare during the Lymphoma, Leukemia and Myeloma Virtual Congress. Dr. Braunstein has also been selected to serve a four-year term as a member of the American Society of Hematology's Committee on Educational Affairs.



**Jef D. Boeke, PhD, DSc**, whose lab redesigns and synthesizes chromosomes and who leads projects to construct the Baker's yeast genome from scratch, and the Dark Matter Project, to dissect mammalian regulatory genomics, was elected to the National Academy of Inventors.



It was a busy fall for Board of Directors member **Deven Parekh**: his namesake Parekh Center for Interdisciplinary Neurology, which supports collaborative research projects across neurological diseases, launched publicly in October, and two months later, he received the RFK Ripple of Hope Award.



**Shruti Naik, PhD**, who studies how and why the immune system can cause inflammatory epithelial conditions and cancer,

was named a New York Stem Cell Foundation–Robertson Stem Cell Investigator. She also earned the Regeneron New Investigator Award for Excellence in Cytokine & Interferon Research.



**Jose U. Scher, MD**, whose microbiome studies revealed a link between microbes in the gut and inflammatory arthritis, notched the Henry Kunkel Early Career Investigator Award.



Two NYU Langone gastroenterologists garnered Healo Honors: **Aasma Shaukat, MD, MPH**, was named Woman Disruptor of the Year for her positive impact within the field, while **Sophie Balzora, MD**, received the Disruptive Innovator Award in Health Equity for enacting meaningful change in the social determinants of health outcomes.



For her leadership and research efforts in the field of type 1 diabetes, **Mary Pat Gallagher, MD**, received the Outstanding Pediatric PI Award from the T1D Exchange QI Collaborative, which is dedicated to improving patient outcomes.



**Anli A. Liu, MD**, who has developed novel tools for assessing memory and discovered mechanisms of memory impairment in epilepsy patients, was named the 2021 Dreifuss-Penry Epilepsy Award winner by the American Academy of Neurology.



**Elaine Shum, MD**, who leads a major study to perform



lung cancer screening for nonsmoking Asian American women who are at increased risk for the disease, collected the Distinguished Young Investigator Research Award from EGFR Resisters. The group's mission is to improve outcomes for patients whose lung cancer is linked to the epidermal growth factor receptor, or EGFR, mutation.



**Nader Moazami, MD**, who led a landmark study on donation after circulatory death as a method of organ preservation, has been named a Top 25 Innovator by *Modern Healthcare* magazine.



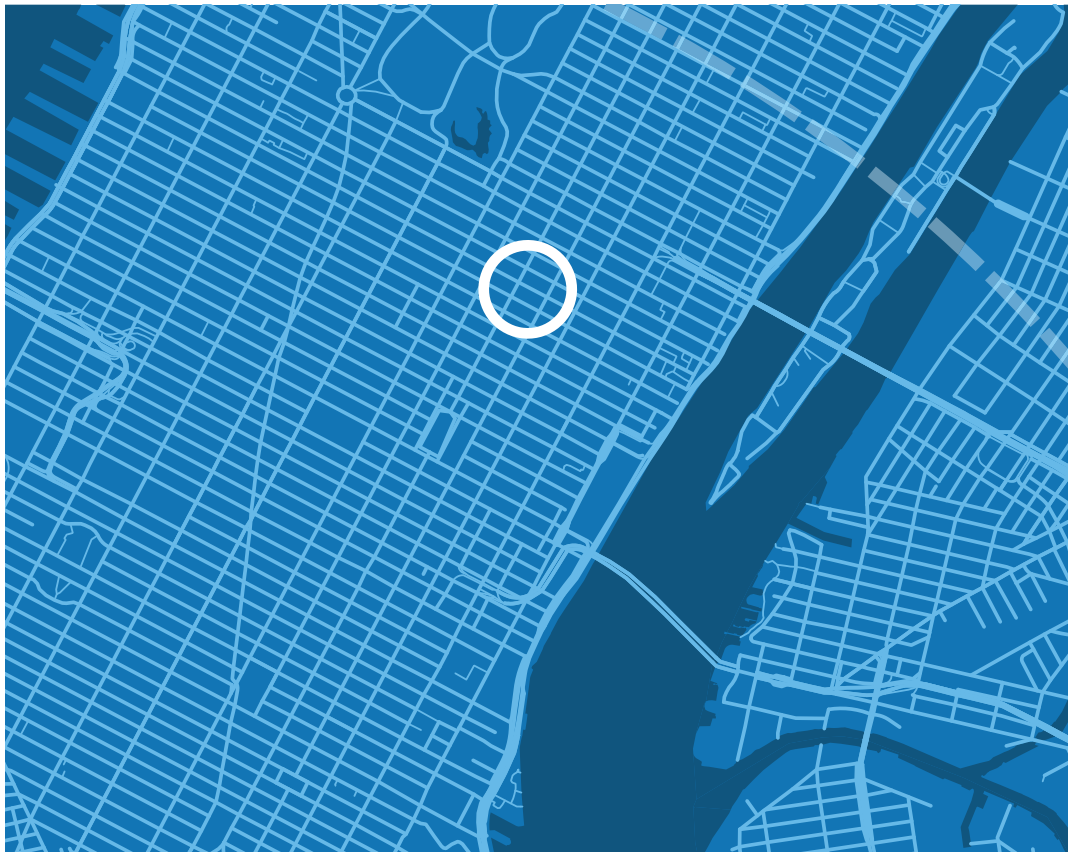
Aortic aneurysms have few notable symptoms, yet their rupture triggers 15,000 deaths each year. For her efforts to detect aortic aneurysms early, **Bhama Ramkhelawon, PhD**, received the Irvine H. Page Junior Faculty Research Award from the American Heart Association.



*City & State New York's* inaugural Mental Health Power 50 list includes two faculty members: **Jennifer Havens, MD**, chair of the Department of Child and Adolescent Psychiatry, and **Amanda M. Spray, PhD**, director of the Steven A. Cohen Military Family Center at NYU Langone.



For his outstanding research in coronary artery disease and the molecular biology of vascular diseases, **Edward Fisher, MD, PhD, MPH**, took home the Pioneer Award in Cardiology from The Medical University of Graz Heart Center in Austria.



## New Practice for Busy New Yorkers Delivers More Services, Less Schlepping

For women, a doctor's appointment can present a string of challenges: carving out time from a hectic schedule, finding childcare, coordinating transportation. Combine that strain with the need for wellness visits, pregnancy care, or treatment for complex conditions such as endometriosis, and the logistics can be daunting. NYU Langone Health aims to ease the burden with a new state-of-the-art multispecialty practice, called NYU Langone Ambulatory Care Center East 53rd Street, located between Lexington and Third Avenues.

"Our vision is to provide care throughout the entire course of our patients' lives, starting in adolescence, through pregnancy and midlife, and extending to life after menopause," says Dana Gossett, MD, chair of the Department of Obstetrics and Gynecology at NYU Grossman School of Medicine. "By growing the size of this practice, we can provide more personalized care by connecting our patients with specialists right in the same building."

The new facility is home to:

- ▶ More than 30 obstetrician-gynecologists from NYU Langone Obstetrics and Gynecology Associates
- ▶ NYU Langone's Endometriosis Center
- ▶ Maternal-Fetal Medicine at NYU Langone Obstetrics and Gynecology Associates, specializing in high-risk pregnancy care
- ▶ An on-site operating suite for minor procedures, such as biopsy and hysteroscopy

Coming soon:

- ▶ The main office of the NYU Langone Fertility Center (relocating from First Avenue in Manhattan)
- ▶ The Joan H. Tisch Center for Women's Health (relocating from the Upper East Side)
- ▶ The new Center for Fibroid Care
- ▶ Services for perinatal mental health, menopause, and urogynecologic conditions
- ▶ A new radiology location for mammography and other imaging services





## Kidney Care



Edward Smith, 92, has received dialysis treatments at NYU Langone Hospital—Long Island since 2014. When his wife, Joan, couldn't be at his side due to restrictions during the pandemic, he relied heavily on his nursing team for assistance. "Edward thrives here," says Francesca Babel, RN, one of his nurses. "This is what nursing should be—helping patients maintain life and quality of life."

# FOR DIALYSIS PATIENTS ON LONG ISLAND, SUPERB NURSING CARE MEANS SUPERIOR OUTCOMES

IF THE SCIENCE OF XENOTRANSPLANTATION—using nonhuman organs and tissue in humans—progresses as hoped, all patients with life-threatening kidney conditions may one day benefit from transplantation. But until then, most will be sustained by dialysis, a rigorous treatment that employs a machine to do the work of the kidneys, filtering toxins from the blood and removing excess fluid and salt. It's a demanding regimen, usually required three times per week, with skilled supervision to mitigate potential complications.

Enter the dialysis program at NYU Langone Hospital—Long Island. Nationally recognized for its excellence, the program is certified by the 5-Diamond Patient Safety Program, which promotes quality and safety among institutions that treat kidney failure. Now in its fifth decade, the dialysis program, whose flagship site is located at the hospital's main campus in Mineola, was the first hospital-based program of its kind on Long Island. Each year, its team provides about 52,000 dialysis treatments, some 48,000 in an outpatient or home setting and 4,000 to inpatients. Thanks in part to an approved new technology that facilitates home dialysis, the program is currently expanding home treatments. "The attitude of our nursing team is one of the things that make our dialysis program special," says Naveed Masani, MD, medical director of dialysis services at NYU Langone Hospital—Long Island.

For Edward F. Smith, a 92-year-old dialysis patient at NYU Langone Hospital—Long Island, the program's stellar nursing staff has been a lifesaver. Smith has received treatment for kidney failure at the Bethpage facility since 2014. When a case of shingles left him so weak that he was unable to walk or care for himself without assistance, Smith relied heavily on the program's nursing team and other staff during his treatments. "We took extra care to make sure he was safe at all times, bringing him to and from the car by wheelchair until he regained his strength," says Francesca Babel, RN, clinical nurse manager.

Dr. Masani notes that unlike many dialysis programs, which rely on technicians to provide patient care, the one at NYU Langone Hospital—Long Island is entirely "physician ordered and nurse driven," he says. This model, he reports, leads to better clinical outcomes than the national average because it goes above and beyond the standard level of care—and builds a stronger bridge to transplantation. "At its best, dialysis is an extremely difficult adjustment for patients and their families," explains Dr. Masani, assistant professor of medicine. "But if you're one of our patients, and you qualify for a kidney transplant, you're more than twice as likely to receive one, according to data from the Centers for Medicare and Medicaid Services."

71% | 29%

OF THE NEARLY 800,000 PEOPLE IN THE US LIVING WITH KIDNEY FAILURE, 71% ARE ON DIALYSIS AND 29% HAVE RECEIVED A KIDNEY TRANSPLANT. AS THE POPULATION AGES, THE PREVALENCE OF THIS CONDITION IS SOARING, WITH HYPERTENSION AND DIABETES ACCOUNTING FOR MOST CASES OF KIDNEY FAILURE.



TO FIND A DOCTOR WHO TREATS KIDNEY DISEASE, VISIT [NYULANGONE.ORG/KIDNEYDISEASE](http://NYULANGONE.ORG/KIDNEYDISEASE), OR CALL 646-929-7950.



## 60-Second Science



## What Happened to Our Tails?

It's a question that researcher Bo Xia has been asking himself since childhood. Now a graduate student in stem cell biology at NYU Grossman School of Medicine, Xia and his colleagues have closed in on the answer. In a new study, the scientists describe the discovery of a mutation that might have prevented us from sprouting tails. The mutation, conserved in humans and apes, may have randomly appeared in early apes as far back as 25 million years ago, the researchers speculate, setting the stage for our predecessors to grow a tailbone instead of a tail. While the research offers hard proof that a single genetic mutation could leave us tailless, the evolutionary advantage of such a change remains a mystery.





Photograph by Brad Trent



# Can Help End the Acute Shortage of Donor Organs?

THE CONCEPT OF transplanting animal organs, tissues, or cells into humans has a long and fitful history. In 1667, King Louis XIV's personal physician tapped the veins of farm animals to perform blood transfusions. The practice was quickly banned when two patients died. Fast forward three centuries to 1963, when Dr. Keith Reemtsma, a pioneer of organ transplantation at Tulane University, transplanted kidneys from 13 chimpanzees into humans. All the recipients died from infections, but one 23-year-old woman survived for nine months. Her case was a watershed moment for cross-species transplantation, or xenotransplantation, and inspired a flurry of new research.

Today, after nearly six decades, that scientific investment is paying major dividends with a rush of remarkable clinical advances. On September 25, 2021, NYU Langone Health completed the first success-

ful transplant of a nonhuman kidney to a deceased patient whose circulation was sustained through life support. The pig kidney, genetically engineered for humans and attached to the blood vessels in the upper leg of the decedent donor, functioned perfectly throughout the 54-hour study. Days later, surgeons at the University of Alabama at Birmingham transplanted two pig kidneys into the abdomen of a deceased patient for three days. Just three months later, surgeons from the University of Maryland achieved another critical milestone by implanting an engineered pig heart into a living patient. The 57-year-old man had terminal heart disease and failed to be listed for a human heart because of a history of poor compliance with medical care. The patient, who remained hospitalized, died two months later. At press time, it was unclear whether organ rejection contributed to his death. Yet, the mere fact that the pig

heart functioned well for more than a month represents a milestone in medical science.

For Robert Montgomery, MD, DPhil, director of the Transplant Institute, who led NYU Langone's xenotransplantation surgical team, the rapid progress represents a major turning point for the field of transplantation—one that could potentially save the lives of many of the 6,000 patients who die annually waiting for a donor organ. "As a heart transplant recipient myself due to a genetic disorder, I am thrilled by the news of a successful xenotransplant of the heart and the hope it gives to my family and other patients who will eventually be saved by this breakthrough," says Dr. Montgomery, the H. Leon Pachter, MD, Professor of Surgery and chair of surgery.

Xenotransplantation, more than any other medical innovation, holds the power to solve the critical short-

Dr. Robert Montgomery, who underwent a heart transplant himself in 2018, believes xenotransplantation may one day end the shortage of donor organs, potentially saving the lives of countless thousands. "I predict that a decade from now, we'll be broadly transplanting kidneys, hearts, lungs, and livers from pigs into living humans," he says.

 FOR INFORMATION ABOUT KIDNEY TRANSPLANTATION, VISIT [NYULANGONE.ORG/KIDNEYTRANSPLANT](http://NYULANGONE.ORG/KIDNEYTRANSPLANT), OR CALL 212-263-8134.



**“What was profound about our findings was that the pig kidney functioned just like a human kidney does.”**

ROBERT MONTGOMERY, MD, DPHIL, DIRECTOR OF THE TRANSPLANT INSTITUTE; H. LEON PACHTER, MD, PROFESSOR OF SURGERY AND CHAIR OF SURGERY

age of available donor organs, most notably among the 90,000 people on the kidney waiting list. Nearly half of them will become too ill or die before receiving a donor organ. And that’s not counting the 500,000-plus Americans with end-stage renal disease who depend on dialysis, a lifesaving yet demanding regimen in which a patient is connected to a machine three times a week to remove toxins and excess fluid and salt from the blood. Many of these patients would qualify for a transplant if the supply of available organs could meet the demand. “Individuals who receive a kidney transplant live twice as long on average as those on dialysis, with a better, more independent quality of life,” Dr. Montgomery adds.

NYU Langone’s landmark experiment aimed to test whether a genetically engineered pig organ would function properly in a human body, and it did. Significantly, there were no signs of rejection, a validation of the genetic engineering used to eliminate the sugar molecule in the pig kidney that has spurred organ rejection in previous attempts at xenotransplantation into humans. A second xenotransplantation, performed two months later under the same conditions at NYU Langone, had identical, highly encouraging results. “What was profound about our findings was that the pig kidney functioned just like a human kidney transplant does,” says Dr. Montgomery. As with all trials in humans, the study, submitted for peer review, was approved by an NYU Langone research ethics oversight board.

Dr. Montgomery’s latest success builds on a long résumé of transplantation innovations, including pioneering work in the laparoscopic procurement of donor kidneys, which eases the recovery process for donors; the expanded use of organs

containing the hepatitis C virus for transplantation; and domino paired donation, a method of swapping live donor kidneys to compatible patients that is responsible for nearly 1,000 transplants each year in the US.

Building on its recent successes, NYU Langone is forging ahead on multiple fronts. Dr. Montgomery plans to conduct another kidney transplant study among deceased patients that will examine what happens between two and four weeks following transplantation, when potentially severe rejection problems could develop. “This study will optimize the information we can get before embarking on a phase I trial in living humans,” says Dr. Montgomery.



NYU Langone is the #1 heart transplant center in the Northeast, with the shortest waitlist times in the region, according to data published by the Scientific Registry of Transplant Recipients.



## Why Pigs?

While the pig might at first seem an odd source of organ donation, these domesticated animals are the most favorable xenotransplantation option for a host of reasons. Apes and monkeys are closest to humans anatomically and physiologically, but their organs carry a higher risk of virus transmission. Beyond this, a majority of primate species are threatened by diminished numbers or even extinction. Pigs, by contrast, are plentiful, have large litters, grow quickly, are comparatively easy to genetically modify, and are less likely to transmit infections. Moreover, they are already used broadly in the medical field as sources for heart valves, insulin, blood thinners, and skin grafts. “Human donors are preferable, but our research points to the potential of an unlimited, sustainable supply of organs,” says Dr. Montgomery. “The goal is that in the future, no one should die waiting for a lifesaving organ.”



## For New Jersey Patients, a New Bridge to Transplantation

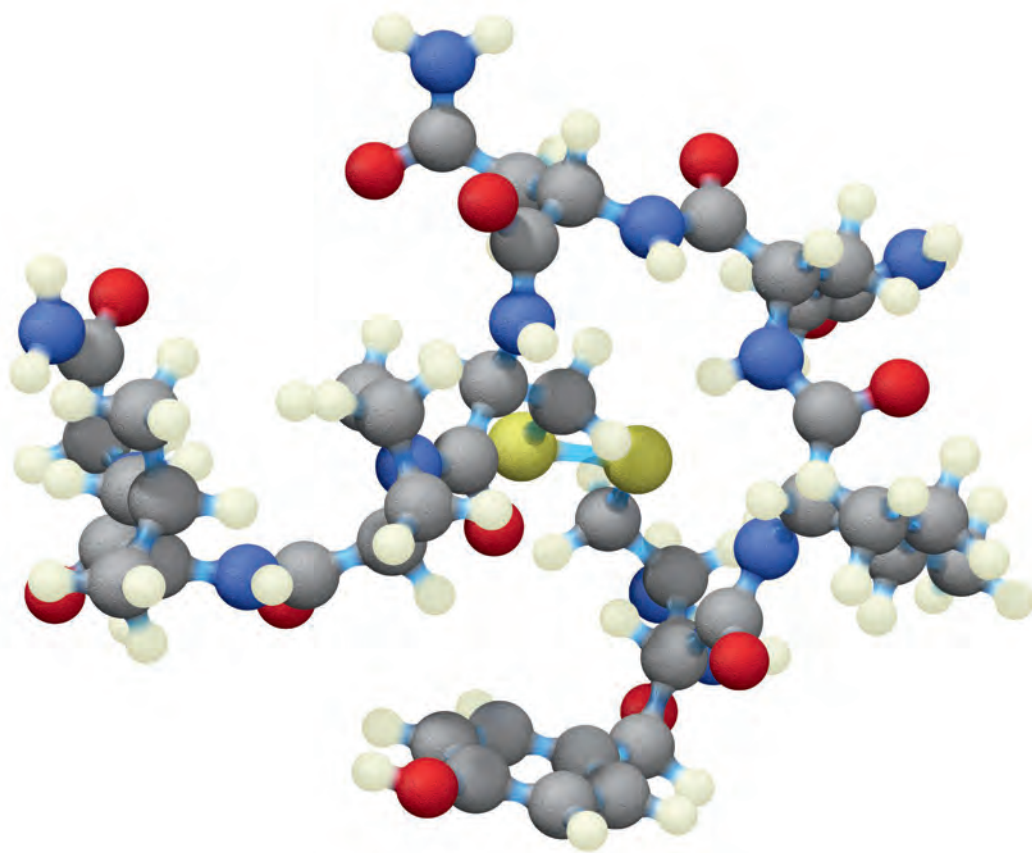
New Jersey patients in need of a lifesaving heart or liver transplant now have greater access to the NYU Langone Transplant Institute through a partnership with Atlantic Health System, a healthcare network that serves nearly 5 million people in the state. The clinical affiliation enables patients with end-stage heart failure to receive the bulk of their pre- and postoperative care close to home, at Morristown Medical Center, while receiving a heart transplant at NYU Langone, top-ranked in the Northeast by the Scientific Registry of Transplant Recipients. Similarly, patients who need a liver transplant will receive pre- and postoperative care at Overlook Medical Center, in Summit, New Jersey, while undergoing transplantation surgery at NYU Langone. “This new partnership elevates transplant care for thousands of New Jersey families and will save many lives,” says Robert Montgomery, MD, DPhil, chair of surgery and director of the NYU Langone Transplant Institute.



PHOTO BY LUTHERHILL; ILLUSTRATION BY THEASIS

60-Second Science

## Oxytocin Can Make You a Better Parent



Oxytocin can boost your parenting skills, even if you're not a parent. Building on years of landmark research into the role of oxytocin in maternal behavior, researchers at NYU Grossman School of Medicine have shown in mice that just *watching* a mother care for her young can boost oxytocin levels and inspire maternal behavior, even among female rodents with no offspring of their own. In a paper published online in *Nature*, the researchers describe a never-before-documented behavior in which virgin female mice housed among a new mom and her pups begin mimicking the mom's maternal habits within 24 hours, gathering pups into the nest, just like the mom. A deeper analysis of electrical activity in the brains of the virgin mice revealed that just the sight and sound of crying pups separated from their nest could stimulate the production of oxytocin. “Our study shows that in mice, the best way to be a mom is to watch and learn from an experienced mom,” says study senior investigator Robert C. Froemke, PhD, a member of Skirball Institute of Biomolecular Medicine at NYU Langone Health. “Given the evidence, we propose that similar mechanisms operate in human mothers.”

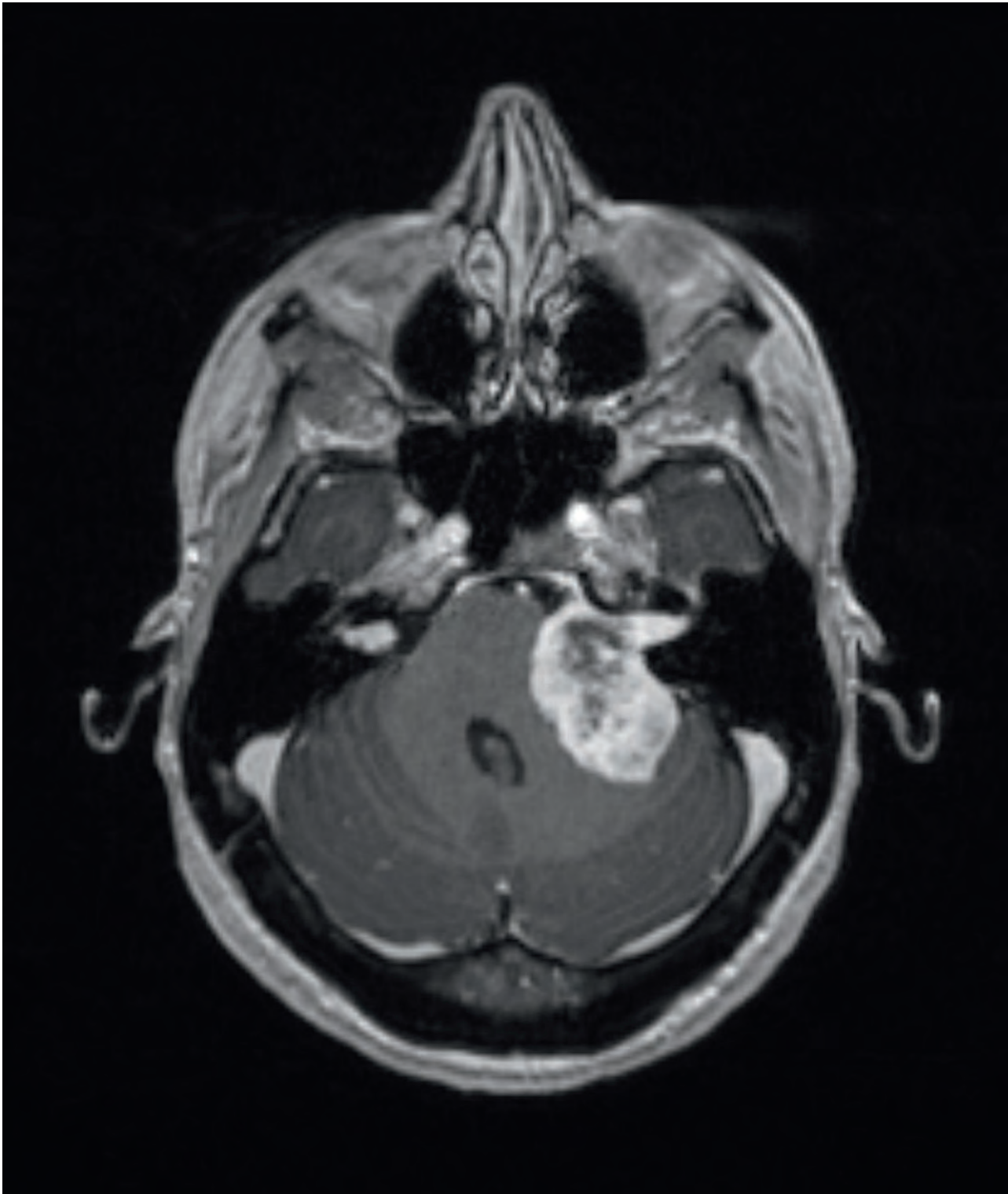


[Complex Cases](#)

# Robbed of Her Hearing, a Classical Musician Finally Finds a Diagnosis—and a Novel Path to Recovery







Above: A brain scan shows a benign tumor about the size of a grape filling Laura Barbieri's internal auditory canal and compressing her brainstem. Opposite: While adjusting to her auditory brainstem implant one day, Laura Barbieri heard her husband, Rob, also a wine connoisseur, pop the cork in another room. "I was like, 'Oh, my God, for the first time I can hear a bottle of wine opening again,'" she says.

**IN 2006, LAURA BARBIERI** was delighted with her role as a clarinetist in the Houston Grand Opera Orchestra, when she noticed one day that the hearing in her right ear felt blocked. "It was soon after I had the flu," she recalls, "so I just assumed that it was a lingering symptom." But the problem persisted, and by 2008, she experienced a progressive decline in hearing in that ear, as well as bouts of tinnitus. A brain scan revealed a benign tumor about the size of grape growing on the nerves that control hearing and balance. In April 2009, the tumor was removed by a surgeon in Los Angeles, but by then, Barbieri had entirely lost hearing in her right ear.

Fearing further damage to her hearing, Barbieri consulted several neurosurgeons, including John Golfinos, MD, chair of the Department of Neurosurgery at NYU

Langone Health. Dr. Golfinos told her that he suspected an underlying disease known as neurofibromatosis type 2 (NF2). A genetic disease that strikes about 1 in 25,000 people, NF2 causes tumors to grow on the nerves of the peripheral nervous system.

Dr. Golfinos' professional instinct proved correct. A follow-up scan showed another tumor budding on the nerves of her left ear. "I consulted a ton of doctors," she recalls, "but Dr. Golfinos was the only one who discerned that I had NF2." For Barbieri, a classical musician who had spent two decades honing her skills to earn a coveted spot in a major orchestra, the diagnosis was "earth shattering." She describes music as her primary language. "Playing," she says, "was the thing that made me feel most fulfilled, the thing I felt I most had

to offer the world."

In 2010, Barbieri moved to New York for a job, settling in the Prospect Heights section of Brooklyn. She continued her care at NYU Langone's Comprehensive Neurofibromatosis Center, the largest neurofibromatosis clinic in the US. The connection not only afforded her the highest level of multidisciplinary expertise, but also led to an unprecedented surgical intervention to stem the escalating damage caused by the disease.

By January 2021, Barbieri had gone completely deaf and started to notice tingling on the left side of her face, along with weakness that made it difficult to smile or raise an eyebrow. A tumor compressing the brainstem can affect facial movement, swallowing, and vocalization, among other things. Barbieri was forced to communicate with a voice-to-text app on her phone.

With Barbieri's auditory nerve now irreparably damaged, J. Thomas Roland, Jr., MD, chair of the Department of Otolaryngology-Head and Neck Surgery at NYU Langone, recommended an auditory brainstem implant (ABI), a device that could recreate the electrical pathways that normally stimulate the auditory nerve and enable the brain to interpret sound. NYU Langone is one of only three medical centers on the East Coast to offer the device. Since its FDA approval for patients with NF2 in 2000, thanks in part to Dr. Roland's pioneering work on the clinical trial, Dr. Roland and his team of neurotologists have successfully treated over 150 patients. "I can't cure this disease surgically," explains Dr. Roland, "so my aim is to restore some of the hearing the patient has lost."

A complex case like Barbieri's would typically involve three separate surgeries—one to remove the tumor, another to implant the ABI, and a third to reanimate the facial nerves—each requiring a lengthy recovery. But Dr. Roland conceived a surgical plan—never before attempted at NYU Langone or, to his knowledge, any other medical center—in which all three operations could be



TO FIND A DOCTOR WHO TREATS NEUROFIBROMATOSIS, VISIT [NYU-LANGONE.ORG/NEUROFIBROMATOSISCENTER](http://NYU-LANGONE.ORG/NEUROFIBROMATOSISCENTER), OR CALL 212-263-9695.



**“Close teamwork is what allows us to tackle the most difficult cases with confidence. It’s unlikely that we’ll encounter problems we haven’t seen before, but if we do, we’ll be able to handle them.”**

JOHN GOLFINOS, MD, CHAIR, DEPARTMENT OF NEUROSURGERY



Head and neck surgeon J. Thomas Roland, Jr., MD (left), and neurosurgeon John Golfinos, MD, have collaborated on skull base cases for nearly 30 years, sharing a particular expertise in NF2 tumors and acoustic neuromas.

performed sequentially in a single day. He knew Barbieri was up for it. “Laura is a remarkable person,” he says. Barbieri had previously completed three Ironman triathlons, a dozen Half Ironman competitions, and 24 marathons—feats that, she says, “made me feel like I was stronger than the disease.”

In March 2021, 15 years after neurofibromatosis had started to rob Barbieri of her hearing and her livelihood, she entered an operating room at NYU Langone to regain some of what she had lost. After Dr. Golfinos and Dr. Roland removed the tumor, they began the process of implanting the ABI. Then, Adam Jacobson, MD, a head and neck surgeon who is director of the Facial Paralysis and

Reanimation Center, performed grafts to rewire Barbieri’s facial nerves and provide a new electrical supply to weak muscles that, over time, would restore tone and movement to the left side of her face. “Close teamwork is what allows us to tackle the most difficult cases with confidence,” notes Dr. Golfinos. “It’s unlikely that we’ll encounter problems we haven’t seen before, but if we do, we’ll be able to handle them.”

Barbieri, now married, reports that she’s already regained some facial tone and movement. Dr. Jacobson expects her to continue to improve for up to two years after surgery. “My NYU Langone doctors have been absolutely amazing,” says

Barbieri. While she is still unable to hear music, she credits the ABI with keeping her connected to it. “It jogs my memory of music and allows me to imagine what might be happening in my own mind,” she says. “If there’s music playing, at least I can hear the rhythm, the percussion. These little things make a big difference.”

Barbieri’s recovery has inspired her to pursue a new direction professionally. Formerly in sales, she’s now thinking about working with people who have suffered a hearing loss. “As someone who has gone through this experience, and having been a musician, I think I’m in a unique position to help people work through this process,” she says.

**LESS THAN  
0.1%**

MORTALITY RATE FOR  
CRANIAL PROCEDURES AT NYU  
LANGONE HEALTH



NYU Langone’s Department of Neurosurgery is rated #1 in the country by Vizient, Inc., the nation’s largest member-driven healthcare performance improvement company, for its ability to lead patients who experience clinical complications to a full recovery.





Dr. Adam Jacobson has explained to Laura Barbieri that once her healing has optimized, two years after facial reanimation surgery, they can explore the option of additional nerve grafts to further improve her outcome.

## WHERE PATIENTS GO TO GET THEIR SMILES BACK: THE FACIAL PARALYSIS AND REANIMATION CENTER

Surgery for an acoustic neuroma, a tumor commonly caused by neurofibromatosis type 2, may require a tragic tradeoff: removing or damaging the facial nerve to excise the lesion. But facial paralysis, which usually affects one side of the face, impacting both function and appearance, can also be caused by a host of other conditions, including a head injury, infection, stroke, or Bell's palsy. Facial paralysis afflicts tens of thousands of Americans, but "every patient is different," explains J. Thomas Roland, Jr., MD, chair of the Department of Otolaryngology–Head and Neck Surgery. "The duration might be short or long. The function of certain nerves might be present or might not. The best treatment might be medical, surgical, rehabilitative, or all three."

In 2014, recognizing the need for a comprehensive approach to care, Dr. Roland established NYU Langone Health's Facial Paralysis and Reanimation Center, which marshals the expertise of clinical specialists from numerous disciplines. The only program of its kind in New York City, it draws nearly 100 patients each year, many with complex cases, from all over. "We have the capacity to do all kinds of

things, even for patients with very prolonged facial paralysis," says Dr. Roland. "Our spectrum of talent enables us to tell patients with full confidence that we can offer them an option that hasn't been tried before or wouldn't be available at most centers."

At the heart of the Center is its monthly case conference, led by Judy Lee, MD, director of the Division of Facial Plastic and Reconstructive Surgery, and Adam Jacobson, MD, director of the Division of Head and Neck Surgery. "We're very thoughtful about how we approach our reanimations," says Dr. Jacobson. "There's no pioneering technique that is not being done right here." Dr. Jacobson trained as an oncologic and reconstructive surgeon, but he transitioned to facial reanimation surgery to address what he felt was a void in postoperative care. "I wanted to give my cancer patients a better outcome after sacrificing the facial nerve to remove a tumor," he explains.

Allison Most, NP, the center's patient coordinator, also finds it deeply rewarding to work with this patient population. "I love the work we do," she says, "because we're giving something back instead of taking something away."







[Hassenfeld Children's Hospital](#)

## A Big Hole, Tiny Vessels, and a Pioneering Procedure to Save a Newborn's Heart

# Max

MAX GETTINGER IS A typical toddler. Chubby cheeks, endlessly curious, always on the go. But his heart is unique. Unique in spirit, yes, but also unique in medical history.

Max was born with a cardiac defect so rare that the condition has no name. Only six cases have been documented worldwide since the first was reported in 1981.

Max's mother, Ellen Gettinger, 35, describes her pregnancy in 2019 as uneventful until a routine ultrasound during her third trimester detected an abnormal heart. She was referred to NYU Langone Health's fetal cardiology service and Maternal Fetal Medicine Program for an evaluation. Tests confirmed the troubling news—a tunnel-shaped hole, or fistula, between the left and right chambers of Max's heart. The breach caused blood to recirculate, enlarging his heart and depriving other organs of oxygen. Without an urgent intervention at birth, the condition would cause heart failure. Ellen and her husband, Jonathan, were devastated by the news.

Congenital heart problems, the most common type of birth defect, affect about 1% of the babies born annually in the US—some 40,000 infants. NYU Langone's Pediatric Congenital Heart Program, part of Hassenfeld Children's Hospital, treats about 250 cases each year.

Hassenfeld Children's Hospital has the highest risk-adjusted survival rate of any hospital in New York State for pediatric patients who require congenital heart surgery, but Max's case was unusually complex. He was also diagnosed with a cardiac condition known as Wolff-Parkinson-White syndrome, which causes a rapid heartbeat. "Max had a lethal combination of defects," explains Frank Cecchin, MD, the Andrall E. Pearson Professor of Pediatric Cardiology and director of the Division of Pediatric Cardiology.

The Gettingers needed an urgent postnatal medical plan to save Max's life. About 20 members of the Pediatric Congenital Heart Program team convened to strategize ways to close the hole in Max's heart once he was born. Pediatric cardiac surgeons determined that sealing it surgically would be too risky because the defect was located on the back wall of the heart, making it difficult to access if postoperative bleeding occurred. Interventional cardiologist Michael Argilla, MD, director of the Pediatric Catheterization Lab, suggested closing the hole with a vascular plug made of a pliable nickel-titanium alloy delivered through a catheter. The only catch: it was designed for adults. The procedure would be extremely delicate and unpredictable, the team agreed, but

With both of his critical heart defects resolved, thanks to the exceptional care he received at Hassenfeld Children's Hospital, Max Gettinger is now an active, healthy toddler.





without it, Max would die.

Ellen began 30 hours of labor on September 25, 2019, and Max made his debut the following evening. She was able to hold him for just a few minutes before he was whisked away to Hassenfeld Children's Hospital's congenital cardiovascular care unit, where Max was later placed on a ventilator. With Max in heart failure, the device enabled his heart and lungs to meet his body's need for oxygen and nutrients.

After 12 days, when Max weighed just six pounds, Dr. Argilla and his partner, pediatric interventional cardiologist Sunil Saharan, MD, began the process of threading a tiny catheter into his heart through veins and arteries no wider than a strand of spaghetti. Just in case the plug didn't stay in place and emergency surgery became necessary, a pediatric cardiac surgeon was on standby. For the next seven hours, without a break, Drs. Argilla and Saharan tried multiple pathways to get to the fistula, using the baby's groin, navel, and femoral artery as entry points and trying different approaches to seal the hole. For visualization, they relied on real-time X-rays with a con-

Dr. Michael Argilla (second from right) and Dr. Sunil Saharan (far right) reunited with Max, now two, and his parents, Ellen and Jonathan Gettinger, last year. "This was the most challenging procedure we've done," says Dr. Argilla, "but we wanted this child to be given every possible chance at a normal life. That's what drove us."

trast dye injected to highlight blood vessels. "We needed four hands working with all these catheters," explains Dr. Argilla. "You can't be aggressive and fast inside a heart the size of a plum."

Each step presented daunting challenges. The pathway in Max's heart had sharp turns, making it difficult to negotiate. The first mesh plug, designed for adults, didn't fit. Just as the doctors were starting to lose hope after hours of painstaking effort, they tried one more time, using a different wire through the umbilical vein to deploy a larger plug. "We got the plug in position in 10 minutes," recalls Dr. Saharan, "and we could tell that it fit." The doctors felt a wave of relief as Max's heart function improved immediately. "I'm a parent as well," says Dr. Argilla, "so it chokes me up to think of a parent putting their child's life in someone else's hands. Ellen and Jonathan are phenomenal people."

For Ellen Gettinger, the intervention's success was "the best news we ever received." At last, they held their baby, and within days, Max was weaned off the ventilator, and then most medica-

tions. Tissue began growing over the device, securing it in place. After learning how to give a daily injection into Max's thigh to treat his heart's electrical problem, the Gettingers took him home to their apartment in Astoria, Queens.

Max showed no signs of an irregular heart rate over the following months, as the pandemic descended upon the world. That fall, after celebrating his first birthday, Max returned to Hassenfeld Children's Hospital, and Dr. Cecchin normalized his heart rate by ablating cardiac tissue with a heating device to create tiny scars that block abnormal electrical signals. With both critical heart defects resolved, Max buzzed with energy.

Now a high-spirited two-year-old as stubborn as any other, Max ran nonstop around the hospital courtyard recently as Drs. Argilla and Saharan looked on with bemused awe. "He's a unique baby, with a unique heart," said Dr. Saharan, clinical assistant professor of pediatrics. "He was in the right place at the right time. It doesn't get any better than that."



TO FIND A DOCTOR WHO TREATS PEDIATRIC CARDIAC CONDITIONS, VISIT [NYULANGONE.ORG/PEDIATRICHEART](http://NYULANGONE.ORG/PEDIATRICHEART), OR CALL 212-263-5989.



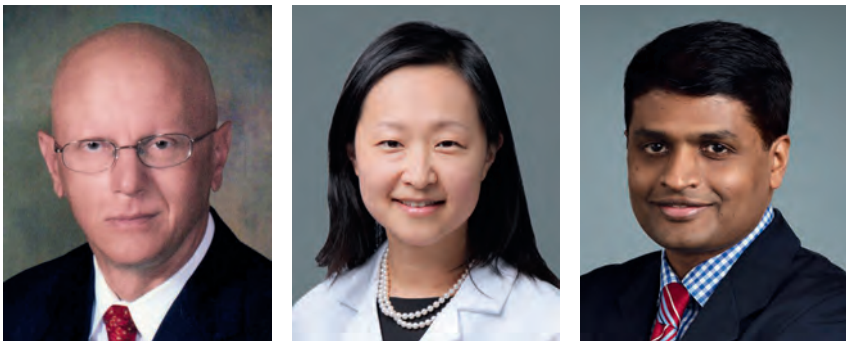
# A Go-to Destination for Pediatric Cardiac Care



■ The Pediatric Congenital Heart Program at Hassenfeld Children’s Hospital treats the most complex forms of congenital heart disease, performing nearly 250 operations annually. The program has the highest risk-adjusted survival rate of any hospital in New York State for pediatric patients, according to a report by the state’s Department of Health, which takes into account the complexity of care at the time of surgery, as well as the number of children treated for the condition at the institution.

■ Hassenfeld Children’s Hospital outperforms the national average for clinical outcomes, complication rates, and length of hospital stay, according to the Society of Thoracic Surgeons. NYU Langone’s overall survival rate for pediatric cardiac surgery is 99%, compared with a national rate of 97.2%. For neonates, the survival rate is 96.2%, compared with a national average of 92%. For infants up to age one, the survival rate is 99.5%, compared with a national average of 97.4%.

■ NYU Langone’s neonatal intensive care unit in Manhattan is designated by the New York State Department of Health as a Regional Perinatal Center for its expertise in delivering the highest level of prenatal and newborn care. The Level 4 unit has the most comprehensive status assigned by the American Academy of Pediatrics.



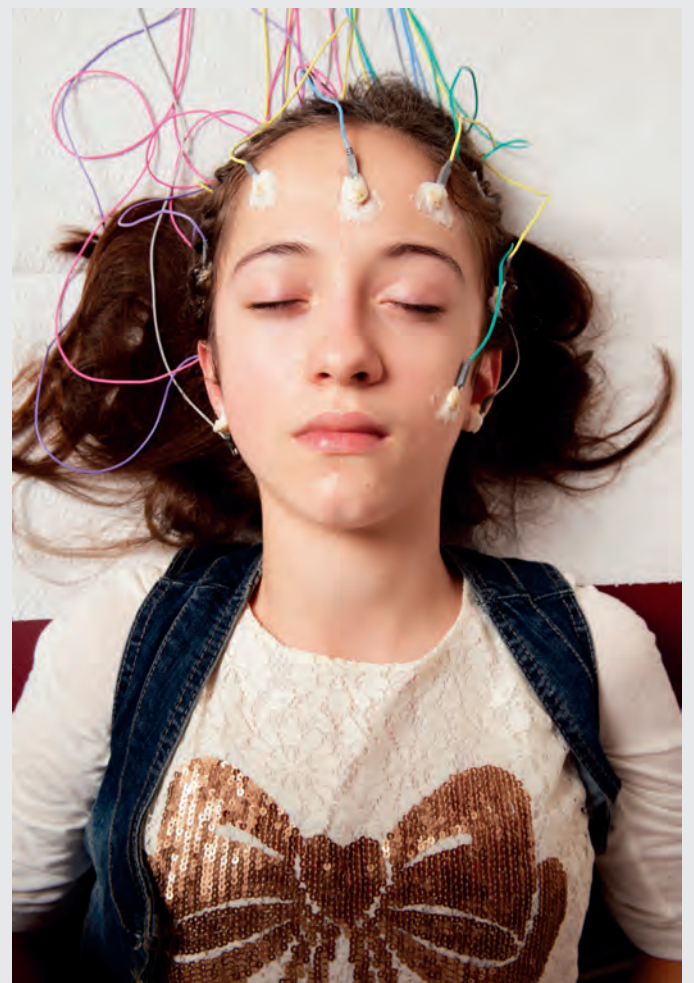
## Meet #TeamMax

Beyond the doctors who led his lifesaving procedure, Max Gettinger’s care team included several specialists who also made significant contributions to his successful outcome.

- ▶ Salvatore Presti, MD, clinical associate professor of pediatrics (pediatric cardiology), referred Ellen and Jonathan Gettinger to NYU Langone’s Maternal Fetal Medicine Program.
- ▶ Anne Chun, MD, clinical associate professor of pediatrics (pediatric cardiology) and director of fetal cardiology, coordinated Max’s prenatal pediatric cardiology care.
- ▶ T.K. Susheel Kumar, MD, associate professor of cardiothoracic surgery, remained on standby throughout the procedure in the event that emergency cardiac surgery was required.

### 60-Second Science

# The Surprising Link between Sleep, Blood Sugar, and Obesity



The hippocampus plays an outside role in learning and memory. But this powerful sliver of tissue tucked deep within the brain also has another big job: regulating metabolism. Science has long held that the hippocampus performs these two very different jobs separately. Now, new research challenges that convention with evidence that brain signals known to help memories form may also influence blood-sugar levels during sleep. “Our study is the first to show how clusters of brain cells firing in the hippocampus may directly regulate metabolism during sleep,” says senior study author György Buzsáki, MD, PhD, the Biggs Professor of Neuroscience in the Department of Neuroscience and Physiology at NYU Langone Health. The new findings in rodents offer a biological mechanism for the epidemiological link between obesity and sleep, suggesting that sleep dysfunction may interfere with healthy metabolic function during slumber, which in turn can drive obesity and type 2 diabetes.

PHOTO (TOP) BY ELLIOT GOLDSTEIN; PHOTO (FAR RIGHT) BY FMAJOR/GETTY IMAGES





Photograph by Jonathan Kozowyk



[Hassenfeld Children's Hospital](#)

# Transplants Give Kids the Confidence to

# Dream Big

**“Before my transplant, a walk around the block would tire me out. I struggled with depression. I wasn’t sure that I would go to college or even be able to work a regular job.”**

MAZ ZISAN, 18 (OPPOSITE)



FOR INFORMATION ABOUT PEDIATRIC HEART TRANSPLANTATION, VISIT [NYULANGONE.ORG/PEDSHEARTFAILUREANDTRANSPLANT](http://NYULANGONE.ORG/PEDSHEARTFAILUREANDTRANSPLANT), OR CALL 212-263-5940. FOR PEDIATRIC LUNG TRANSPLANTATION, VISIT [NYULANGONE.ORG/LUNGTRANSPLANT](http://NYULANGONE.ORG/LUNGTRANSPLANT), OR CALL 866-838-5864.

ALEJANDRA, 16, SPENT her childhood wishing for what she considered a “normal life.” She wanted to play soccer. Sleep without a breathing machine. Take deep breaths.

Maz Zisan, 18, went from regular mixed martial arts workouts to being exhausted by a walk around the block, his overworked heart straining at the effort. His dream of majoring in mechanical engineering and getting his pilot’s license seemed unattainable.

For both Maz and Alejandra, planning for the future moved from dream to reality in 2021, when they became the first pediatric heart and lung transplant recipients, respectively, at NYU Langone Health’s Hassenfeld Children’s Hospital.

Alejandra received a new pair of lungs last May to replace the ones ravaged by cystic fibrosis, a genetic disease that caused deadly damage to her lungs. In August, Maz received a new heart to treat hypertrophic cardiomyopathy (HCM), a congenital condition that causes the wall between the heart’s chambers to thicken, restricting blood flow. HCM is a leading cause of sudden cardiac death in young people. Before their transplants, neither teen dared to plan too far into the future. But now they’re dreaming big, unconstrained by acute illness, and savoring life’s simple joys.

“The second I woke up from surgery I really felt something was different,” says Alejandra, who lives in Westchester County. “It was life changing. Breathing is just— it’s awesome. I used to struggle to take tiny, tiny breaths. Now, I take deep, deep breaths, and it’s just incredible.”

Maz, too, is excited to regain health and momentum. A martial arts enthusiast, he likens his new heart, strong enough to power his active lifestyle, to a performance engine in a Tesla. He works out weekly, rides his scooter to college classes, and works part-time as a pharmacy technician. “Before my transplant, a walk around the block would tire me out. I struggled with depression. I wasn’t sure that I would go to college or even be able to work a regular job,” says Maz, a Brooklyn native. “But I’ve recovered quickly, and I’m back at the gym practicing mixed martial arts with my younger brother. And I am planning to become a pilot.”

The pediatric heart and lung transplant programs are both part of the NYU Langone Transplant Institute, a recognized leader in transplant surgery and research. The Pediatric Heart Failure and Transplant Program is led by Surgical Director T.K. Susheel Kumar, MD, associate professor of cardiothoracic surgery, and Medical Director Rakesh Singh, MD, associate professor of pediatrics. Dr. Kumar, who has performed dozens of pediatric heart transplants, is renowned for his expertise in treating complex congenital heart conditions. Before joining NYU Langone, Dr. Singh supervised care for more than 150



Alejandra credits her care team at the NYU Langone Transplant Institute for her life-changing, and lifesaving, new lungs. It includes (left to right) T.K. Susheel Kumar, MD, pediatric cardiac surgeon; Stephanie H. Chang, MD, surgical director for lung transplantation; Eleanor Muise, MD, pediatric pulmonologist; and Luis F. Angel, MD, medical director for lung transplantation.







**“The second I woke up from surgery I really felt something was different. It was life changing. Breathing is just—it’s awesome. I used to struggle to take tiny, tiny breaths. Now, I take deep, deep breaths, and it’s just incredible.”**

**ALEJANDRA, 16, THE FIRST PEDIATRIC LUNG TRANSPLANT RECIPIENT AT HASSENFELD CHILDREN’S HOSPITAL AT NYU LANGONE**

heart transplant recipients.

Their patients receive the latest available heart failure treatments prior to transplant, says Dr. Singh, and the program collaborates with transplant centers across the country to review data and develop new protocols to improve patient care. In addition, as part of the NYU Langone Transplant Institute, the Pediatric Heart Failure and Transplant Program benefits from the institute’s innovative research and renowned expertise, explains Dr. Singh. NYU Langone’s Heart Transplant Program has been ranked the top program

in the northeast by the Scientific Registry for Transplant Recipients (SRTR), with the shortest waitlist times and highest one-year survival among high-volume centers in the region. “Our colleagues who made that happen are involved in the pediatric program, too,” notes Dr. Singh. “That allows us to think outside the box and address long-standing hurdles in pediatric transplantation, such as increasing the donor pool or providing access to children who might not otherwise qualify for a transplant due to the severity of their illness.”

Being part of a larger adult program bolsters the pediatric lung transplant team as well, notes pediatric pulmonologist Eleanor Muise, MD, assistant professor of pediatrics, who cares for children before and after lung transplant surgery. She is part of a team that includes Luis F. Angel, MD, medical director of lung transplantation, and Stephanie H. Chang, MD, surgical director of the program. NYU Langone’s lung transplantation program is one of the top programs in the country, based on a combination of high one-year survival rates and speed to transplant as reported by SRTR.

With advances in the treatment of cystic fibrosis, the need for lung transplants in children is less than it used to be, notes Dr. Muise. But for youths like Alejandra who desperately need this treatment, there is a

tremendous benefit to being treated by doctors at a combined pediatric and adult program. “At NYU Langone, the surgical experience of the adult program provides a huge benefit for the children we treat,” Dr. Muise says.

Children who receive transplants at NYU Langone become inpatients at Hassenfeld Children’s Hospital’s congenital cardiovascular care unit, which features all single-bedded rooms with sleeping space for a parent or caregiver.

“NYU Langone was the best choice for my transplant,” says Alejandra. “The attention and care are so wonderful. I’ve never experienced anything like that before, and there are no words to explain how really thankful I am for my doctors here.”

Pediatric patients also benefit from the Sala Institute for Child and Family Centered Care, which provides social support and addresses children’s emotional well-being.

“The transplant relationship is very special. My patients know I am their person. I know what they like to eat, when they’re supposed to go to bed, because I want them to understand how important those things are to their health,” says Dr. Muise, who forms long-term relationships with her patients. “They make it so easy to love them, and I feel so happy when I see them feeling better.”



## Ophthalmology



## Kathryn A. Colby, MD, PhD, Sets Her Sights on New Treatments to Tackle a Vision-Stealing Disease

THE EXPANSION OF NYU Langone Eye Center to several locations throughout New York City dovetails with the recruitment of Kathryn A. Colby, MD, PhD, a renowned expert in the treatment of corneal and other ocular diseases. Dr. Colby joined NYU Langone Health as the Elisabeth J. Cohen, MD, Professor of Ophthalmology and chair of the Department of Ophthalmology. She was previously chair of the Department of Ophthalmology and Visual Science at the University of Chicago, where she was the Louis Block Professor.

Among Dr. Colby's major contributions to the field of ophthalmology is the development of a minimally invasive procedure for Fuchs dystrophy, a progressive disease that can lead to blurry vision, light sensitivity, eye pain, and poor night vision. Fuchs impacts about 4% of people over age 40, most of them women, and results in more corneal transplants in the US than any other vision condition.

Dr. Colby is currently the only ophthalmologist in New York City

who performs the procedure, called Descemet stripping only, or DSO. It involves the removal of a small section of dysfunctional endothelial tissue from the cornea, which allows healthy cells to regenerate and repopulate the area. The procedure eliminates the need for corneal transplant, which poses a risk of tissue rejection and necessitates drugs that suppress immune response to foreign tissue.

Building on her research, Dr. Colby now leads an international clinical trial, funded by Kowa Pharmaceuticals, to investigate the efficacy of specially formulated eyedrops containing a compound known as a ROCK inhibitor to help promote healing following DSO surgery.

"We're already planning the definitive phase 3 trial, which sets the stage for FDA approval," says Dr. Colby, who chairs the study and leads the only trial site in New York State. "These ROCK inhibitors may prevent progression of Fuchs dystrophy early on and help patients avoid surgery."

**"ROCK inhibitors may prevent progression of Fuchs dystrophy early on and help patients avoid surgery."**

KATHRYN A. COLBY, MD, PHD, ELISABETH J. COHEN, MD, PROFESSOR OF OPHTHALMOLOGY AND CHAIR OF THE DEPARTMENT OF OPHTHALMOLOGY



TO FIND A DOCTOR WHO TREATS EYE CONDITIONS, VISIT NYULANGONE.ORG/EYECENTER, OR CALL 212-263-2573.





## 60-Second Science

# COVID VACCINES DURING PREGNANCY EXTEND PROTECTION TO NEWBORNS

Antibodies developed against COVID-19 infection during pregnancy can reach the placenta, extending protection to a newborn during its earliest and most vulnerable days of life. But do the antibodies a mother develops after immunization also protect the newborn?

The question holds serious implications, not only because infants may come into contact with unvaccinated individuals, but also because only 40% of pregnant people are vaccinated, according to the Centers for Disease Control and Prevention (CDC), and the risk of complications from COVID infection during pregnancy can be dire. “Pregnant people who contract COVID are more likely to require hospitalization, ICU care, and mechanical ventilation,” says maternal-fetal medicine specialist Ashley S. Roman, MD, vice chair for clinical affairs, obstetrics, at NYU Grossman School of Medicine. “COVID infection can also increase the risk of miscarriage and preterm births.”

Dr. Roman and colleagues at NYU Grossman School of Medicine set out to tackle this big unknown with the first prospective study to evaluate the immune response to mRNA vaccines in pregnancy. In their study, recently published in *American Journal of Obstetrics & Gynecology*, the researchers found high levels of antibodies unique to the mRNA vaccines in cord blood sampled from 36 pregnant people vaccinated during their first, second, or third trimester who had not contracted COVID. “Our data are the first to distinguish between passive immunity from natural infection and immunity from mRNA vaccination,” says primary investigator Jennifer Lighter, MD, a hospital epidemiologist at NYU Langone Health. “Not only did all the newborns have antibodies—they had very high levels.”

The protection conferred to newborns was recently confirmed by new data from the CDC, which found that babies born to mothers who received two doses of an mRNA vaccine during pregnancy were 61% less likely to be hospitalized with COVID in their first six months of life than those born to unvaccinated people.

Building on these findings, NYU Langone’s Vaccine Center is a trial site for a national effort funded by the National Institutes of Health. Called the Multisite Observational Maternal and Infant Study for COVID-19, or MOMI-VAX, the study will evaluate the immune responses generated by COVID vaccines in over 2,000 pregnant and postpartum patients.

To ensure diversity among participants, NYU Langone has tapped its Family Health Centers, a large network of clinics providing primary care services to people in underserved areas. “It’s vital to determine how a broad range of patients from different backgrounds respond to the vaccine when administered during pregnancy and how this benefit is conferred to their babies,” adds Dr. Roman.



## Outstanding Outcomes

# How NYU Langone Hospital—Brooklyn Became One of the Safest Hospitals in the Country



THEY SAID IT couldn't be done, but NYU Langone Hospital—Brooklyn did it with flying colors. Since its merger with NYU Langone Health in January 2016, the hospital (formerly Lutheran Medical Center) has experienced a 33% decline in hospital mortality rates. The finding, published in January in *JAMA Network Open*, is based on a study conducted by NYU Langone researchers, who analyzed data from more than 122,000 patients during the six-year period prior to the merger, and more than 58,000 patients during the three-year period afterward. The average mortality rate declined from 2.6% in the premerger period to 1.9% postmerger, a 27% decrease. But when risk-adjusted for the underlying health status of patients, the mortality rate drops by 33%.

"A 33% decline in mortality is so robust that it's off the charts—almost unheard of," notes lead study author Erwin C. Wang, MD, MHA, assistant professor of med-

icine at NYU Grossman School of Medicine, physician advisor, and medical director of the nurse practitioner service at NYU Langone Hospital—Brooklyn. Such an achievement has eluded many other acquired hospitals. What makes it all the more remarkable is that the hospital's Sunset Park community in southwest Brooklyn has among the country's highest proportion of patients who are Medicaid beneficiaries. The patient population also includes a significant percentage of uninsured patients, who tend to be sicker than commercially insured patients due to their limited access to healthcare.

The success of NYU Langone Hospital—Brooklyn in lowering its mortality rates, a key measure of a hospital's patient safety and quality, stands in stark contrast to a view long held by many healthcare experts. As the rate of hospital consolidations has more than doubled since 2009, most hospital mergers

do not improve quality or safety, even when they involve high-quality acquirers. Most studies show that as hospital competition decreases, overall mortality increases and patient satisfaction can also decrease. Martin Gaynor, PhD, an economist at Carnegie Mellon University who studies the consequences of hospital consolidation, reports that "evidence from three decades of hospital mergers does not support the claim that consolidation improves quality." But consolidation, he notes, is not the same as integration. "If integration happens, it is a long process that occurs after acquisition."

In the case of NYU Langone Hospital—Brooklyn, the "process" began even before the merger, which was designed to be a true integration from its conception. "Full integration has been possible because this was a two-way endeavor from the start," explains Bret J. Rudy, MD, senior vice president and chief of hospital operations at NYU



FOR MORE INFORMATION ABOUT NYU LANGONE HOSPITAL—BROOKLYN, VISIT [NYULANGONE.ORG/HOSPITALBROOKLYN](http://NYULANGONE.ORG/HOSPITALBROOKLYN)





Langone Hospital—Brooklyn, and the senior author of the study. “We combined two really strong cultures to create an even more powerful one.” Dr. Rudy emphasizes that the merger began with the premise that patients in Brooklyn would be cared for with the same standards as those maintained by the hospitals at NYU Langone’s Manhattan campus, and that clinical services at NYU Langone Hospital—Brooklyn would be augmented rather than reduced.

From the outset, Dr. Rudy and his leadership team, along with health system leadership and clinical chairs, focused on five key improvement strategies: creating new service lines and replacing part-time voluntary physician leaders with full-time staff physicians; launching comprehensive electronic health record and cost-accounting systems; promoting ownership of quality outcomes among clinical leaders; establishing performance goals with real-time, actionable



NYU Langone Hospital—Brooklyn has one of the lowest risk-adjusted mortality rates not just in Brooklyn, but in the nation.

data; and introducing value-based interventions driven by analytics.

“The first thing we did was to identify the processes and systems that may have contributed to adverse outcomes,” Dr. Rudy explains. “Then, we implemented the proper changes. Most importantly, we changed the culture, applying new accountability standards to everyone at the hospital.”

Since the merger, NYU Langone has invested millions in its Brooklyn hospital, and it has become one of the safest hospitals in New York City, with one of the lowest mortality rates not just in Brooklyn, but in the nation. NYU Langone tracks over 800 quality and safety metrics as part of a continual effort to improve its performance, using dashboards and other surveillance tools to monitor and map daily clinical trends. The hospital’s leadership mines this information to compare outcomes against both internal and external performance measures.

“Having data at your fingertips that is accurate and actionable is vital to benchmarking,” says Dr. Rudy. “The dashboards were critical to achieving our goals.”

Although the primary focus of the study was hospital mortality, it also showed a 39% reduction in central line infections, a 33% drop in catheter-associated urinary tract infections, and a higher likelihood of patients recommending the hospital or giving it a top-tier ranking.

“Our study shows that when a hospital merger has a comprehensive strategy, focuses on quality, and involves meaningful operational integration, outcomes can be significantly improved at the acquired hospital,” says Dr. Wang. “I’d like to think that the way that we approached the merger at NYU Langone Hospital—Brooklyn can serve as a blueprint for other health systems to achieve success.”

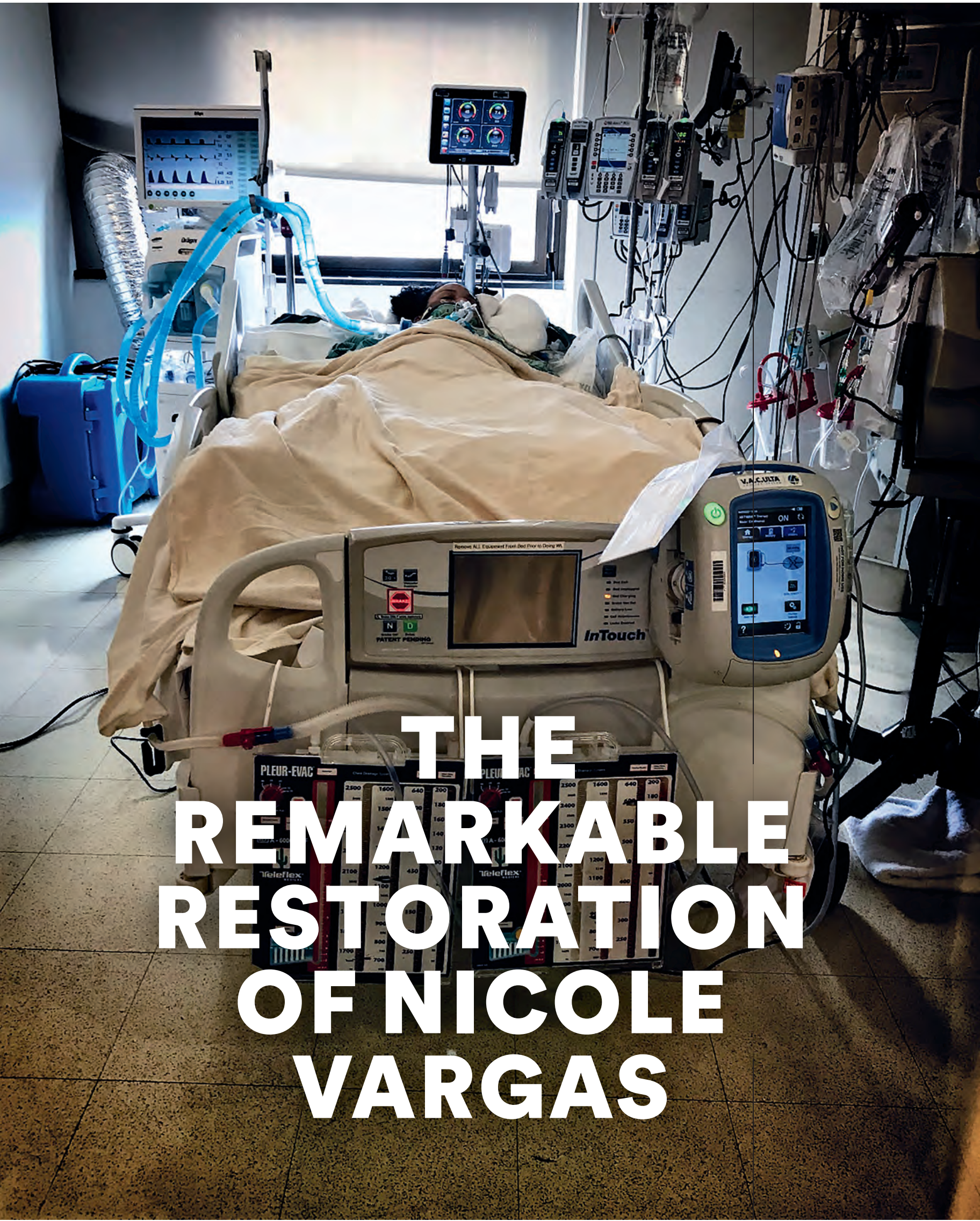


## Trauma Care

A devastating car crash last year sent Nicole Vargas to the Level 1 Trauma Center at NYU Langone Hospital—Long Island, where a team of 20 clinicians saved her life. With her recovery nearly complete, she's become a premed student at Queens College.







# THE REMARKABLE RESTORATION OF NICOLE VARGAS



**“Our singular mission is to get the patient through the worst day of their life so that they can come out on the other side.”**

ADAM STRIGHT, MD, ACUTE CARE AND TRAUMA SURGEON  
AT NYU LANGONE HOSPITAL—LONG ISLAND



At NYU Langone Hospital—Long Island’s Trauma Center, respiratory therapist Jeff Espert and acute care and trauma surgeons Dr. D’Andrea Joseph and Dr. Adam Stright demonstrate emergency care procedures on a mock patient.

**LAST EASTER**, Nicole Vargas met with unthinkable tragedy. At 3:00 a.m. on April 4, the 28-year-old resident of Elmhurst, Queens, was in the passenger seat of a car that raced along Jericho Turnpike in Mineola, Long Island, before colliding with two other vehicles and crashing into a storefront. Upon impact, the car split in two, with the back end engulfed in flames and the front overturned into a brick wall. Vargas and the driver, a male friend, were hurled through the windshield. The driver, thrown the length of a football field, did not survive. Vargas was pinned between a section of the chassis and the wall. EMS technicians worked quickly to extricate her, alerting the Emergency Department at NYU Langone Hospital—Long Island, just one mile away, of the imminent arrival.

The hospital’s Level I Trauma Center, one of three in Nassau County, cares for some 2,200 accident victims each year. More than 20% of the blunt or penetrating injuries it treats are severe enough to threaten life or limb. Vargas’s dire condition, however, would test the

limits of the team’s prowess. Her injuries included collapsed lungs, multiple fractured ribs, a broken right thighbone, several spinal fractures, extensive lacerations to both lobes of her liver, and a fist-size puncture in her lower back. Acute care and trauma surgeon Adam Stright, MD, at NYU Long Island School of Medicine, was on call that night and led the effort to resuscitate Vargas. He described her condition as nearly “unsurvivable.”

At the crash scene, Vargas was found unconscious and clinically dead. “Her heart had stopped beating,” explains Dr. Stright. When Vargas was wheeled into the trauma bay, the team continued the CPR begun by EMS. Laura Velcu, MD, another acute care and trauma surgeon, helped stabilize Vargas for transfer to the OR. Among other interventions, tubes were inserted to decompress her chest, and a transfusion was administered to stem her massive blood loss. “It took

more than 30 minutes to finally get Nicole’s pulse back,” says Dr. Stright. When a patient’s heart has stopped beating for more than 20 minutes, the risk of irreparable brain damage or death skyrockets. “Nicole is really weak,” Dr. Stright told her husband, Adem. “She might not make it through the night.”

There’s no set cutoff point for when to discontinue resuscitation efforts, he explains, and in Vargas’s case, he kept going because he found considerable cause for hope. She was young and otherwise healthy. Moreover, the team did not identify a major brain injury, which would cause neurological deficits that preclude a meaningful recovery. Dr. Stright also noticed that Vargas was coughing, evidence that her brain was still functioning. “These sustained signs of life guide our clinical judgment and tell us that what we’re doing is working,” he says. “Our singular mission is to get the patient through the worst day of their life so that they can come out on the other side.”

The trauma team packed the wound in Vargas’s lower back to control blood loss, but they couldn’t be sure whether her state of shock was due to internal bleeding. When an abdominal ultrasound indicated the presence of blood, explains Dr. Stright, “we knew that the only way to save Nicole was to get her to the operating room to perform exploratory surgery.” En route to the OR, the anesthesiologist reported that Vargas’s blood pressure had dropped so low that it was undetectable. Dr. Stright performed CPR again, this time for 15 minutes. “I could feel a pulse in Nicole’s carotid artery,” he says, “so I decided to proceed with the surgery, delivering blood throughout the operation.” Dr. Stright repaired a severe injury to Vargas’s liver, which stopped the internal bleeding, but because her abdomen was too swollen to suture, closure of the muscle layer was later performed by acute care and trauma surgeon Gerard Baltazar, DO. After Dr. Stright’s surgery, Vargas’s condition stabilized, but persistent bleeding from the puncture in her lower

back caused her blood pressure to drop. Vascular interventional radiologist Man Hon, MD, identified the ruptured blood vessel and blocked it off to stop the bleeding.

Vargas required several weeks of intensive care to recover from her blood loss, and multiple surgeries to repair fractures to her spine and leg, but she was finally on the road to recovery. On May 24, Vargas’s birthday, she had the last of her surgeries, a skin graft performed by acute care and trauma surgeon D’Andrea Joseph, MD. Vargas was discharged from the hospital one week later. As chief of the Division of Acute Care Surgery and Trauma at NYU Langone Hospital—Long Island, Dr. Joseph oversees the care of complex cases. “Nicole’s prognosis is excellent,” says Dr. Joseph. “She has a bit of weakness in her right leg, but with physical therapy, she should be able to overcome this.”

The remarkable comeback of Nicole Vargas underscores the breadth and depth of the Level I Trauma Center’s expertise. “We do this work knowing that if the patient gets to us in time, we can intervene and save their life,” says Dr. Joseph, who notes that a multidisciplinary array of specialists is always on call. “I lead the team with that attitude.”

Dr. Joseph, who joined NYU Langone in 2017, explains that she came to NYU Langone Hospital—Long Island, in large part, because she felt a kinship with Collin Brathwaite, MD, chair of the hospital’s Department of Surgery. Like Dr. Joseph, Dr. Brathwaite trained at the renowned R Adams Cowley Shock Trauma Center at the University of Maryland Medical Center. The first hospital dedicated exclusively to trauma care, it provided a model for expediting the arrival of patients through a dedicated trauma bay that is separate from the Emergency Department.

Vargas, now a premed student at Queens College, plans to emulate her doctors and become a trauma surgeon. “Dr. Stright and his team never gave up on me,” she says. “They saved my life. I’m never going to forget what they did for me.”

FOR MORE INFORMATION ABOUT NYU LANGONE HOSPITAL—LONG ISLAND’S LEVEL I TRAUMA CENTER, VISIT NYU-LANGONE.ORG/TRAUMACENTERLI





Acute care and trauma surgeon Dr. Adam Stright was among the first doctors who helped revive Nicole Vargas, while trauma team leader Dr. D'Andrea Joseph, chief of acute care surgery and trauma, oversaw her care and performed a skin graft—one of many critical interventions that helped repair her shattered body.

## A LEVEL I TRAUMA TEAM THAT PERFORMS AT ITS LEVEL BEST

“Nicole Vargas survived because she got everything she needed when she needed it,” says Adam Stright, MD, who was among a team of 20 clinicians that saved her. “That’s how you provide care at a Level I Trauma Center.” Of the more than 6,000 hospitals in the US, only 141 are certified by the American College of Surgeons as Level 1 Trauma Centers, signifying that they serve their communities 24/7 with definitive care for patients whose injuries endanger their lives. “The Level I designation means that a trauma center not only meets the highest standards of patient care,” notes Dr. Stright, “but that it’s dedicated to advancing trauma medicine to improve clinical outcomes nationwide.” Studies show that patients treated at a Level I Trauma Center have a 25% higher chance of survival.

The Level I Trauma Center at NYU Langone Hospital—Long Island is one of two such units operated by NYU Langone Health, the other one located at NYU Langone Hospital—Brooklyn. Of the approximately 2,200 trauma patients brought to the Long Island hospital each year, 94% have sustained a blunt injury from a fall or motor vehicle accident, and 6% have a penetrating injury, usually caused by a gunshot or knife wound. “Trauma centers reflect the surrounding

community, and NYU Langone Hospital—Long Island is no exception,” says D’Andrea Joseph, MD, who oversaw Vargas’s restoration.

The center’s six full-time trauma specialists are trained in emergency general surgery, trauma surgery, and surgical critical care. They are uniquely skilled at prioritizing multiple severe injuries, operating on every major body cavity, and dealing with the complexities of shock, a life-threatening condition resulting from inadequate blood flow. “We see patients through their entire hospital stay, from the initial presentation through rehabilitation,” explains Dr. Joseph. “The care we provide is soup to nuts.” Dr. Stright adds that the trauma team is greatly enhanced by its nurses, who are “so excellent that they enable us to focus entirely on the patient.”

The unit boasts two resources that are unique not only to Level I Trauma Centers in Nassau County, but to those in the entire state. It maintains its own dedicated blood supply and has a dedicated Trauma Bay that is separate and apart from the main Emergency Department. “Our experience and training are superior to many other trauma centers,” says Dr. Joseph. “But what really makes us shine is that we work as a family and treat our patients like family.”



## Health Equity

# What's Race Got to Do with It?

MEDICINE IS A science of risk calculation. It makes sense, then, that physicians routinely rely on data-driven, evidence-based formulas and calculations to help discern risks and guide treatment protocols for their patients. Nearly every specialty of medicine uses clinical-decision tools, and more than 90% of hospitals have integrated medical algorithms into electronic health records in an effort to improve outcomes. But what happens when those tools inadvertently propagate faulty assumptions and bad data? According to a landmark paper published in the *New England Journal of Medicine* in 2020, the results can be devastating, especially for Black and Hispanic patients.

At least 15 clinical algorithms in use today—many of them endorsed by leading medical associations—embed race into the equation, notes Olugbenga G. Ogedegbe, MD, MPH, founder and inaugural director of NYU Langone's Institute for Excellence in Health Equity. "Clinical calculators are used as a proxy for the gold-standard treatment of patients," says Dr. Ogedegbe, the Dr. Adolph and Margaret Berger Professor of Medicine and Population Health. But when the calculations adjust outcomes based on race, he notes, the formulas can result in different treatments and procedures for Black patients than White patients, often resulting in worse outcomes. "Race should not matter in a patient's treatment," adds Dr. Ogedegbe. "Care should be color-blind."

One troubling calculator already corrected at NYU Langone assesses kidney function. The formula assigns Black patients a higher filtration-rate score, a measure of the kidney's ability to rid the body of a waste product called creatinine. "The bad assumption baked into this tool is that Black patients have more muscle mass and therefore higher levels of creatinine," says Dr. Ogedegbe. "This is just false." For Black patients with early-stage kidney dis-



**"Race should not matter in a patient's treatment. Care should be color-blind."**

OLUGBENGA G. OGEDEGBE, MD, MPH (ABOVE), FOUNDER AND INAUGURAL DIRECTOR OF NYU LANGONE'S INSTITUTE FOR EXCELLENCE IN HEALTH EQUITY

ease, the adjustment could mean a missed opportunity to receive specialty care, and for those patients with end-stage kidney failure, the score correction could render them ineligible for the kidney transplant wait list (see "Eliminating Bias from Clinical Calculators," page 39).

"Race is a social construct, and yet it has been used as a substitute

for genetic and biological factors for decades," says Kathie-Ann Joseph, MD, MPH, professor of surgery and population health and vice chair for

diversity and health equity in surgery and at the Transplant Institute. "These calculations assume inherent differences instead of digging deeper into the social determinants that explain why Black people have worse outcomes."

The mission of NYU Langone's Institute for Excellence in Health Equity, founded last year, is to analyze and address the causes of health inequities and, ultimately, level the playing field in clinical care, scientific research, and medical education. Dr. Ogedegbe has spent the last 30 years addressing racial disparities in medicine. Reviewing race-based algorithms is one part of the Institute's larger mandate to ensure health equity is applied to patient experience, data collection through NYU Langone's electronic health record system, and the mentoring of residents and students at NYU Grossman School of Medicine. "We have to reimagine healthcare completely," says Dr. Ogedegbe. "We want to become the leader within this space."

In some cases, removing racial bias is straightforward once it is revealed, as in the case of a clinical-decision tool that had assessed Black and Hispanic women as being 20% less likely than White women to have a successful vaginal birth after a previous C-section. That adjustment has been eliminated from the model. In other cases, though, clinicians may need to find—or create—a replacement calculator. "As doctors, we should be asking why race is a part of these guidelines or of our care," says Ilseung Cho, MD, NYU Langone's chief quality officer, who is leading the effort to review clinical calculators for implicit bias and remove or correct them. "We have an ethical and moral responsibility to close any gaps." He notes that simply pointing out race-based corrections to doctors is often enough to move the needle. "Everybody here aspires to provide equitable care," Dr. Cho says.



FOR INFORMATION ABOUT NYU LANGONE'S INSTITUTE FOR EXCELLENCE IN HEALTH EQUITY, VISIT [NYULMC.ORG/EXCELLENCEINHEALTH-EQUITY](http://NYULMC.ORG/EXCELLENCEINHEALTH-EQUITY), OR EMAIL [IEHEGENERALADMINISTRATION@NYULANGONE.ORG](mailto:IEHEGENERALADMINISTRATION@NYULANGONE.ORG).



## ELIMINATING BIAS FROM CLINICAL CALCULATORS

NYU Langone's Institute for Excellence in Health Equity has identified at least 15 clinical-decision tools nationwide with a race-based component that drive poorer outcomes for Black patients. These two calculators, employed by NYU Langone clinicians, have been revised to remove race adjustments.

### ► Vaginal Birth after Caesarean

Until recently, this long-standing calculator predicted that Black and Hispanic women were 20% less likely to have a successful vaginal birth following a C-section than White women, a factor likely to impact the obstetrician's recommendation and the birth plan chosen by patients in these groups. C-sections are more likely to cause complications, including hemorrhage, sepsis, and uterine rupture, than vaginal births. Race and ethnicity have been removed from the equation. "The problem was with the assumption that the data reflected inherent or biological differences," says Dana R. Gossett, MD, the Stanley H. Kaplan Professor and Chair of Obstetrics and Gynecology. "The truth is that where a patient gets prenatal care, who delivers the baby, and how much support they receive are far more pertinent than the color of their skin."

### ► Kidney Function

The "glomerular filtration rate," or GFR, gauges kidney function by measuring blood levels of creatinine, a waste product generated by muscle and filtered by the kidneys. The GFR score has historically graded Black patients higher based on a false assumption about greater muscle mass and more creatinine production—a bias that has derailed appropriate medical intervention. NYU Langone has eliminated the race component from the calculator. "Black patients have a high burden of hypertension, which can damage the kidneys," says Dr. Ogedegbe. "The bias in this algorithm may prevent them from getting the specialty care they need."



**“All I could picture was just this massive destruction of everything we had built.”**

ANN MARIE SCHMIDT, MD, THE DR. IVEN YOUNG  
PROFESSOR OF ENDOCRINOLOGY

### VITAL SIGNS SERIES LAUNCHES ITS SECOND SEASON OF MUST-HEAR PODCASTS

Ann Marie Schmidt, MD, is renowned for her discovery of a receptor in endothelial cells that triggers a cascade of inflammation implicated in a host of devastating diabetes complications, including heart disease and stroke. Dr. Schmidt's three decades of seminal research is all the more remarkable for the hardship that nearly derailed her career. In a riveting new episode of *Vital Signs*, an original podcast series from NYU Langone Health and SiriusXM, Dr. Schmidt recalls a dark day in October 2012 when 15 million gallons of water, surging from Hurricane Sandy, overflowed from the East River and wiped away years of meticulous diabetes research that relied on genetically modified mice housed in a flooded research facility. Dr. Schmidt vividly recreates the drama of that event and its aftermath and explains how she and her team drew upon "every bit of resource and resilience" to rebuild their research enterprise from scratch.

The episode is part of the second season of *Vital Signs*, launched in January, featuring inspiring stories from eight medical professionals, including several who, like Dr. Schmidt, turned their calamities into triumphs.

■ **VITAL SIGNS** IS AVAILABLE FOR FREE AT SIMPLECAST AND PANDORA, OR WHEREVER YOU LISTEN TO PODCASTS.





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