SUMMER/FALL 2020

EINSTEIN

THE MAGAZINE FOR ALUMNI AND FRIENDS OF ALBERT EINSTEIN COLLEGE OF MEDICINE

CONFRONTING THE COVID-19 CRISIS

Einstein and Montefiore spearhead research and guide patients through a pandemic

A Message from the Dean

When the COVID-19 pandemic struck the Bronx last spring, it disrupted our lives in ways we had never experienced before and for a time it threatened to overwhelm us. But as Albert Einstein once said, "In the middle of difficulty lies opportunity."

Evidence of that can be seen in how different parts of the Einstein community have rallied to confront a virus that was rapidly filling hospitals with new patients daily. Our cover story (page 22) focuses on four Einstein and Montefiore physicians and researchers and how they have organized for the onslaught of patients, dealt with the crisis while in the eye of the storm, and developed potential therapies to save lives.

Our students and staff have risen to the challenge as well. Many fourth-year medical students took the opportunity to graduate several weeks early and join the battle against COVID-19 in Montefiore hospitals (page 12), and some of our graduate students changed the focus of their research to come up with an urgently needed coronavirus antibody test (page 16). Our essential staff members have been keeping our campus running (page 2) during this tremendously challenging period so that crucial experiments can continue.

Over the past several months we have also seen nationwide protests against the systemic racism and police violence that have damaged the lives of Black Americans and other people of color for far too long. Einstein's two deans for diversity share their thoughts on how our community can be a part of the solution (page 18).

Finally, despite COVID-19, our research continues. Type 1 diabetes is increasing at an alarming rate. Einstein and Montefiore scientists are working to address this autoimmune disease on a number of fronts (page 42).

I'm extremely proud of what we've accomplished at Einstein and Montefiore over the past several months. Despite the difficulties that are sure to lie ahead, it's clear that we are taking the opportunity to make many good things happen here.

GORDON F. TOMASELLI, M.D.
The Marilyn and Stanley M. Katz Dean
Albert Einstein College of Medicine
Executive Vice President, Chief Academic Officer
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EINSTEIN
Science at the Heart of Medicine

Summer/Fall 2020

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Artwork commissioned by Montefiore|Einstein, 2020

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Einstein Meets the COVID-19 Challenge

Several Einstein teams stepped up to keep vital services running on campus last spring, when many people were asked to work from home because of the pandemic. These frontline workers have allowed the College of Medicine to continue essential operations around the clock. "A lot goes on behind the scenes," says Neil Kaplan, chief of security and transportation. "The research here never stops."

There are research animals to be cared for, IT support to provide, lab orders to process, mail to deliver, buildings to secure, staff to feed, rooms to sanitize, and heating and cooling to maintain. "Some people took on additional responsibilities last spring and helped out in other departments as well," says Joe Ben-Ari, director of design and construction. "They are proud to be a part of it all, to make sure our experiments can go on. They are truly selfless."

THIS PAGE, at top: Wearing full personal protective equipment to ensure both human and animal safety, staff members Lindann Depesa, left, and Alexis Castanon check on the research mice in the Institute for Animal Studies. Below, chef Dan Lopez wears a face mask as he prepares vegetables for one of the menu options available in the Forchheimer Building's Main Street Café.

OPPOSITE PAGE, clockwise from top left: Multimedia systems engineer Elvis Cruz sets up the technology for a remote learning videoconference broadcast from Robbins Auditorium; Richie Resto of the receiving department makes sure that supplies are delivered to labs; Sonia Torres of the housekeeping department disinfects a hallway; the security team of Gary Francis, left, Marie Bailey, and Amaury Pena screen a visitor at the Michael F. Price Center for Genetic and Translational Medicine/Harold and Muriel Block Research Pavilion; Freddy Vasquez sorts the never-ending stream of Einstein mail for delivery; and engineer Dario Vazquez of facilities management provides maintenance on the central boiler, which provides heating, air conditioning, hot water, and other steam-related services such as autoclaving and cage washing.

VIEW MORE
Find additional photos, including of members of the environmental health & safety team:
magazine.einstein.yu.edu/challenge20

Photos by Jason Torres

Dr. Edward Chu to Lead Cancer Center

Edward Chu, M.D., M.M.S., has been named the director of the National Cancer Institute (NCI)–designated Albert Einstein Cancer Center (AECC), the vice president for cancer medicine at Montefiore Medicine, and a professor of medicine and of molecular pharmacology at Einstein, where he will hold the Carol and Roger Einiger Professorship of Cancer Medicine.

Dr. Chu, who started his new roles on Oct. 1, will unite Einstein's and Montefiore's cancer programs into an integrated research and clinical enterprise.

CLINICIAN AND RESEARCHER

Most recently, Dr. Chu was the deputy director of the University of Pittsburgh Medical Center's Hillman Cancer Center (HCC), the co-leader of the HCC Cancer Therapeutics Program, the director of the HCC Phase 1 Program, the associate director of the University of Pittsburgh Drug Discovery Institute, and the chief of the division of hematology-oncology.

Dr. Chu is a National Institutes of Health–funded basic, translational, and clinical investigator and a clinical oncologist with a history of developing and leading phase 1 and phase 2 clinical trials, particularly for colorectal and other gastroenterology cancers.

With his expertise in cancer pharmacology and drug development, he has been active in designing and developing novel agents and treatment approaches. His research has focused on the molecular mechanisms underlying drug resistance. Additionally, he has studied Chinese herbal medicine and its integration with standard care, with the goal of improving outcomes and reducing the toxic side effects of chemotherapy.

The AECC was one of the first three academic cancer research centers to receive an NCI designation, which it has held since 1972. Under more than two decades of leadership by I. David Goldman, M.D., researchers have made fundamental discoveries revealing how cancers form, grow, and spread. The AECC works with the Montefiore Einstein Center for Cancer Care to conduct hundreds of clinical trials a year. Approximately 80% of its clinical-trial participants are racial or ethnic minorities, and it is one of only 14 minority/underserved clinical sites designated by the NCI Community Oncology Research Program.

EAST COAST ROOTS

Dr. Chu is a native New Englander. He received his undergraduate, master's, and medical degrees from the Brown University Program in Liberal Medical Education and stayed on at Brown to do his internal medicine residency.

He has received numerous academic honors, has authored more than 200 research papers, and holds a patent on a novel siRNA therapeutic molecule.

New Roles for Einstein Faculty

Dr. Gong Picked to Lead Pulmonary Medicine

Michelle Ng Gong, M.D., M.S., has been named chief of the division of pulmonary medicine in the department of medicine at Einstein and Montefiore. Dr. Gong will also continue her roles as chief of the division of critical care medicine and leader of the unified Jay B. Langer Critical Care Network.

Dr. Gong completed a combined fellowship in her two specialties at Harvard Medical School and is board certified in both. Prior to joining Montefiore and Einstein, she worked in the pulmonary and critical care divisions at Massachusetts General Hospital and at Mount Sinai in New York.

As chief of critical care medicine, Dr. Gong expanded staffing and supervision while increasing revenue and cutting expenses and was instrumental in opening the Neuroscience Progressive Care Unit to support the Comprehensive Stroke Center.

As director of critical care research, Dr. Gong built a research program that generated more than $21 million in funding. She is co-leader of the Health Research Implementation and Informatics Core in the Harold and Muriel Block Institute for Clinical and Translational Research at Einstein and Montefiore.

Dr. Tagoe Named Chief of Rheumatology

Clement Tagoe, M.D., Ph.D., has been named chief of the division of rheumatology in the department of medicine at Einstein and Montefiore. Dr. Tagoe joined Einstein and Montefiore in 2004 and previously served as a professor of medicine and director of clinical operations in the division.

Dr. Tagoe's research focuses on autoimmune thyroid disease, which affects about 5% of the population. He is also the site principal investigator for the Consortium of Rheumatology Researchers of North America for rheumatoid arthritis and psoriatic arthritis.

A native of Ghana, Dr. Tagoe earned his medical degree from the University of Ghana Medical School. He completed his Ph.D. in biochemistry at the University of Leeds in the United Kingdom. In 1993, he came to the United States for his internal medicine residency at New York Hospital Medical Center in Queens, where he was chief resident. Dr. Tagoe completed his rheumatology fellowship and postdoctoral fellowship at New York University (NYU), where he became an attending rheumatologist in its Hospital for Joint Disorders.

Prior to his clinical career, he was a research associate at NYU and a senior research associate at Scripps Research Institute in La Jolla, California.

Dr. Chambers to Direct Family Medicine Research

Earle Chambers, Ph.D., M.P.H., has been appointed director of the division of research in the department of family and social medicine at Einstein and Montefiore.

Dr. Chambers is an associate professor of family and social medicine and of epidemiology & population health and a member of the leadership team for the New York Regional Center for Diabetes Translation Research at Einstein.

"As a department, we continue to place health equity front and center, and it's my goal to have our research agenda reflect that," says Dr. Chambers, who began his career at Einstein and Montefiore in 2007. He says he wants to develop a health equity research lab to provide dedicated resources at Einstein to support interdisciplinary studies of the social determinants of health and the inequities that result in harmful outcomes for some people. He also would like to help build a diverse pipeline of investigators, including medical students, residents, and fellows.

Dr. Chambers earned his bachelor's in biology from Duke University, his master's in public health from the University of Illinois at Chicago School of Public Health, and his Ph.D. in epidemiology with a concentration on chronic disease from the University of Pittsburgh Graduate School of Public Health.

Dr. Cassese Named Education Associate Dean

Todd Cassese, M.D., has been named associate dean for medical education at Einstein. Dr. Cassese, an associate professor of medicine at Einstein and a hospitalist at Montefiore, came to Einstein in July 2018 as the inaugural assistant dean for clinical sciences education.

A recognized thought leader in medical education with particular strengths in assessment, basic and clinical science integration, gender equality, and curricular innovations, Dr. Cassese helped lead the task force that restructured students' clinical experiences in the wake of the COVID-19 pandemic and streamlined the preclerkship and clerkship curricula.

Among the positions he has held are: returning scholar in the Harvard Macy Institute Program, Strategic Educators Enhancement Fund fellow with the National Board of Medical Examiners, former president of the Directors of Clinical Skills Courses, and member of the Northeast Group on Educational Affairs Steering Committee of the Association of American Medical Colleges.

Dr. Cassese earned his medical degree at the University of Chicago, where he continued his postgraduate training. He was an assistant professor at Yale University before being recruited to Quinnipiac University as director of its doctoring course.

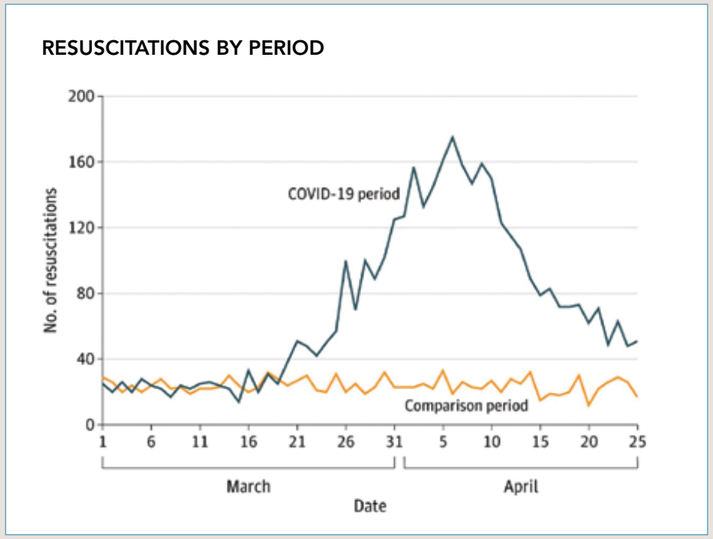
Pandemic Dramatically Increases Cardiac Arrests and Deaths in New York City

The COVID-19 pandemic in New York City caused a surge in out-of-hospital cardiac arrests and deaths, according to a study co-authored by researchers at Einstein, Montefiore, and the Fire Department of the City of New York (FDNY).

The study, published in June in *JAMA Cardiology*, found a threefold increase in out-of-hospital nontraumatic cardiac-arrest cases in March and April 2020 compared with the same period in 2019. On the worst day—April 6—cardiac arrests peaked at 305, a nearly tenfold increase compared with April 6 one year earlier. The mortality rate for cardiac-arrest cases also rose, from 75% in 2019 to more than 90% during the same period in 2020.

"The dramatic increase in cardiac arrests compared with the same period in 2019 strongly indicates that the pandemic was directly or indirectly responsible for that surge in cardiac arrests and deaths," says the study's senior author, David Prezant, M.D., professor of medicine at Einstein, a clinical pulmonologist at Montefiore, and the chief medical officer at the FDNY.

The study used data from the New York City emergency medical services system. Data were analyzed for patients 18 years or older with out-of-hospital cardiac arrest who received EMS resuscitation from March 1, 2020 (when the first case of COVID-19 was diagnosed in New York City), through April 25, 2020 (when EMS call volume had receded to pre-COVID-19 levels). For comparison, cardiac-arrest data were also analyzed for the same time period during 2019.



Source: ©2020 Lai PH et al. *JAMA Cardiology*

This graph plots the number of daily out-of-hospital cardiac-arrest resuscitations performed over the same 56-day period in 2019 (orange) and 2020 (dark blue).

Between March 1 and April 25, 2020, 3,989 patients underwent EMS resuscitation attempts for out-of-hospital cardiac arrests, compared with 1,336 patients who were treated during that period in 2019.

Compared with cardiac arrests in 2019, cardiac arrests occurring during the pandemic were associated with several risk factors. On average, the 2020 patients were:

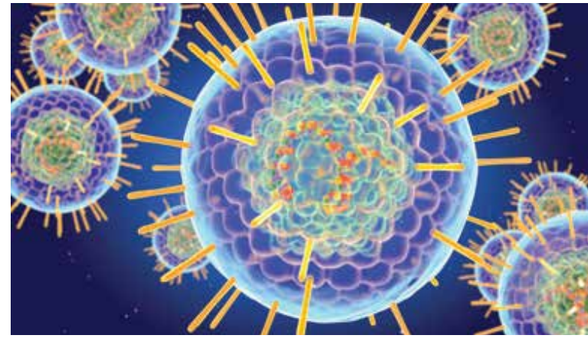
- Older (average age of 72 vs. 68 for the 2019 cardiac-arrest patients)
- Less likely to be white (20% white vs. 33%)
- More likely to have hypertension (54% vs. 46%)
- More likely to have diabetes (36% vs. 26%)
- More likely to have physical limitations (57% vs. 48%)

"Our findings show that it's clearly important to intervene early in the course of COVID-19 infection, before cardiac arrests occur," Dr. Prezant says.

Vaccine Protection Against Herpes

An effective vaccine against herpes viral infections caused by either HSV-1 or HSV-2 remains elusive. Genital herpes (primarily caused by HSV-2) is notorious for promoting HIV infection, and vaccinating against HSV-2 could have a major effect on HIV transmission. An ideal herpes vaccine would not only protect against both HSV-1 and HSV-2 but also protect people already infected with HSV-1 (more commonly associated with oral disease and highly prevalent worldwide) from becoming infected by HSV-2.

In a study published in May in *npj Vaccines*, Betsy Herold, M.D., and colleagues showed that their experimental HSV-2 vaccine, called ΔgD-2, protects against HSV-2 infection in mice already infected with HSV-1. When a different vaccine candidate was used on mice infected with HSV-1, it provided no significant protection against HSV-2 superinfection. By contrast, the ΔgD-2 vaccine completely protected the HSV-1-infected mice from HSV-2 superinfection.



Herpes simplex type 1 virus (HSV-1).

Dr. Herold is a professor of pediatrics, of microbiology & immunology, and of obstetrics & gynecology and women's health. She also holds the Harold and Muriel Block Chair in Pediatrics at Einstein and is chief of the division of pediatric infectious diseases at Einstein and Montefiore.

Mobilizing Blood-Forming Stem Cells

The study's findings may lead to strategies for making more stem cells available in the blood for use in bone-marrow transplants.

Hematopoietic stem cells (HSCs) reside in the bone marrow and produce all of the body's blood cells. Clinicians can stimulate HSCs to enter the bloodstream, where they can be harvested and used for bone-marrow transplantation to treat cancers and other conditions. But just where HSCs actually "live" in the bone marrow has been highly controversial, and the mechanisms involved in mobilizing HSCs to leave the bone marrow have not been well understood.

In a study published online on June 25 in *Cell Stem Cell*, David Fooksman, Ph.D., and colleagues used two-photon-laser-scanning microscopy to observe labeled HSCs in the bone marrow of living mice for several hours. HSCs were thought to remain stationary within the bone marrow, but the researchers found that the survival of HSCs requires that they move around constantly. In addition, Dr. Fooksman and his team showed that blocking a receptor on HSCs, called CXCR4, halts their movement within the bone marrow and causes them to enter the bloodstream. The findings reveal the unexpectedly dynamic nature of HSCs while in the bone marrow and may lead to strategies for making more HSCs available in the blood for use in bone-marrow transplants.

Dr. Fooksman is an associate professor of pathology and of microbiology & immunology at Einstein.

Lab Chat

Jonathan Ross, M.D., is a primary-care physician who focuses on HIV/AIDS. He works to improve access to HIV care in Rwanda and in immigrant communities in the United States. Dr. Ross was born in Israel and raised in Westchester County, New York. After studying medicine at Weill Cornell Medical College, he completed a residency in primary care and social medicine at Montefiore. He joined the Einstein faculty in 2017, where he is an assistant professor of medicine. Dr. Ross recently completed a master's degree through Einstein's Clinical Research Training Program (CRTP).

What sparked your interest in global health?
After college, I served as a Peace Corps volunteer in Mozambique, where I taught high school biology. Living in another society and witnessing its enormous health challenges inspired me to consider a career in public health.

Why did you choose medicine over other possible options?
After returning from the Peace Corps, I worked in community and public health research in New York City. But I worried that a purely public health career would limit my involvement "on the ground." I was advised that medical school would open doors for all sorts of clinical work as well as research.

What attracted you to Einstein and Montefiore?
I did a fourth-year medical school elective at Einstein called "Research-Based Health Activism," which really resonated with me. After that, I decided that Montefiore's social medicine residency would be a great fit for my career goals.

How did your work circle back to Africa?
I needed to write a mock grant for the CRTP, so I modeled it after the research of my mentor, Kathy Anastos, M.D., who works on HIV in Central Africa. My proposal was to study ways to ensure that people with HIV in Rwanda initiate and remain on antiretroviral therapy under the country's HIV treatment guidelines. The NIH [National Institutes of Health] funded my proposal in 2017.

You coauthored a "Viewpoint" article in *JAMA* on the heavy burden of COVID-19 on Bronx immigrants. Were you surprised at the toll on this community?
How quickly the pandemic took hold was a surprise—but its impact on immigrant communities was not, given the numerous barriers they face in accessing care, such as lack of insurance and fear of immigration enforcement. It didn't help that the federal government's new "Public Charge" rule—under which immigrants who obtain public benefits can be denied green cards or visa extensions—went into effect just as the pandemic hit.

Has your clinical role changed during the pandemic?
I've mostly been practicing primary care via telemedicine, but I worked on a COVID-19 ward for a few weeks. The initial uncertainty about how best to care for these patients was a tremendous challenge, to say the least—and worrying about getting infected and infecting my family was scary.

Do you have any hobbies?
I love biking. When I can, I bike to work at Montefiore's Wakefield Ambulatory Care Center. I also love playing guitar but haven't played much in recent months with all the extra challenges of the pandemic.

Dr. Jonathan Ross recently wrote a *JAMA* article about COVID-19's impact on immigrant communities.

Photo by Jason Torres

$111 Million NCI Grant for Preventing and Treating HIV-Associated Cancers

The widespread use of antiretroviral therapy has helped people with HIV live healthier, longer lives—but it also means an increased risk for developing cancer. For 25 years, the AIDS Malignancy Consortium (AMC) has led efforts to improve and treat HIV-related cancers. Now Montefiore and Einstein have received a five-year, $111 million National Cancer Institute (NCI) grant to lead this international research consortium.

"People living with HIV shoulder an enormous burden of cancer," says Joseph Sparano, M.D., associate chair for clinical research in the department of oncology at Montefiore, associate director for clinical research at the NCI-designated Albert Einstein Cancer Center, and principal investigator on the grant. "Montefiore and Einstein are perfectly positioned to lead this organization and steer research advances."

ENGAGING THE COMMUNITY

Approximately 38 million people are infected with HIV, including 1.2 million in the United States. People living with HIV have an increased risk of developing cancer compared with the general population and are more likely to die of cancer, interrupting otherwise healthy lives. This is due to a variety of causes, including long-term inflammation and an overtaxed immune system.

In addition, HIV infections are concentrated in marginalized communities in the United States, primarily among people of color, who make up approximately 70% of new infections.

Joseph Sparano, M.D., leads the AIDS Malignancy Consortium.

"AMC is the only organization worldwide solely dedicated to the study, treatment, and prevention of cancer in this group of people," Dr. Sparano says.

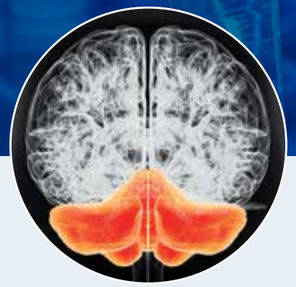
The AMC oversees a network of 42 clinical trial sites in the United States, Africa, and Latin America, as well as translational scientists who support its clinical trials. It also runs a career enhancement program to cultivate the next generation of leaders. Luca Paoluzzi, M.D., director of the HIV Oncology Service at Montefiore and assistant professor of medicine at Einstein, will act as the AMC's principal investigator at Montefiore and Einstein.

PARTNERSHIP WITH CFAR

In collaboration with Harris Goldstein, M.D., director of the Einstein-Rockefeller-CUNY Center for AIDS Research (CFAR) and professor of pediatrics and of microbiology & immunology at Einstein, Dr. Sparano has established a scientific working group focused on cancer and HIV that will guide the direction of future collaborative research at the CFAR and the AMC.

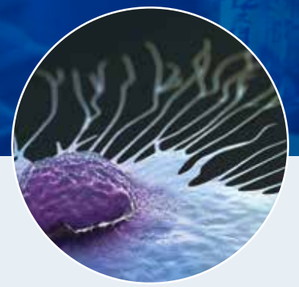
The group will be co-chaired by Dr. Sparano and Howard Strickler, M.D., professor and chief of epidemiology in the department of epidemiology & population health at Einstein and Montefiore.

WATCH THE VIDEO
See Dr. Sparano discuss his plans for the future of the AMC:
magazine.einstein.yu.edu/Sparano20



Probing Predementia and Alzheimer's

Joe Verghese, M.B.B.S., M.S., received two five-year National Institutes of Health (NIH) grants totaling $13.8 million to study predementia and Alzheimer's disease. Dr. Verghese is a professor and the chief of the unified divisions of geriatrics and of cognitive & motor aging at Einstein and Montefiore, the Murray D. Gross Memorial Faculty Scholar in Gerontology, and the director of the Resnick Gerontology Center at Einstein. The first grant, for $7.6 million, funds a study of the predementia condition called motoric cognitive risk (MCR). The study, involving 11,000 older adults in six countries, will look for biomarkers for MCR. The second grant, for $6.2 million, funds research on at-home use of transcranial direct current stimulation (tDCS), delivered through a head covering. The study will evaluate whether six-month use of tDCS can improve cognition in 100 Alzheimer's patients.



Predicting the Spread of Breast Cancer

Einstein researchers have received a five-year, $5.1 million grant from the NIH to further develop their novel tests for predicting whether primary breast tumors are likely to spread. The principal investigators are Thomas Rohan, M.B.B.S., Ph.D., D.H.Sc., professor and chair of epidemiology & population health, and John Condeelis, Ph.D., professor and co-chair of anatomy & structural biology. The test for predicting tumor spread was developed by Dr. Condeelis and his colleagues in the Gruss Lipper Biophotonics Center and its Integrated Imaging Program, both of which he co-directs. They had observed that breast cancer spreads elsewhere in the body when three specific cell types are in direct contact, forming a "doorway" (referred to as a tumor microenvironment of metastasis, or TMEM) that allows tumor cells to enter blood vessels. The greater the number of TMEMs observed in tumors, the more likely the tumor will metastasize.

Understanding 'Chemo Brain' in Children

Chemotherapy usually cures children diagnosed with acute lymphoblastic leukemia, but it may affect key cognitive functions, including memory and attention. Elyse Sussman, Ph.D., professor in the Dominick P. Purpura Department of Neuroscience and of otorhinolaryngology-head and neck surgery, along with colleagues at the Rutgers Cancer Institute of New Jersey, has received a five-year, $4.6 million NIH grant to determine how chemotherapy exerts its damaging effects on the brain. They will investigate how chemotherapy disrupts sensory processing, memory, and attention in children; where damage is occurring in the brain; and whether a biomarker can be found to identify those most vulnerable. Their long-term objective is to develop protective interventions that can prevent permanent harm. The new study will include 240 children between the ages of 5 and 12 at Children's Hospital at Montefiore and the Rutgers Cancer Institute.

Understanding the Causes of TB Latency

Many people who are infected with *Mycobacterium tuberculosis* (*Mtb*), the bacterial pathogen that causes tuberculosis (TB), harbor latent bacteria that later in life reactivate to cause active disease. Determining the mechanisms that regulate *Mtb* latency is important for understanding how the bacteria inflicts its damage. Research by John Chan, M.D., suggests that the *Mtb* gene *Rv2623* may play an important role in regulating *Mtb* latency. The NIH has awarded Dr. Chan a five-year, $4.5 million grant to study how Rv2623—the protein encoded by the *Rv2623* gene—regulates the growth of *Mtb* in an infected host. The findings from this research may reveal how *Mtb* evades the host's immune response to persist in a dormant state in infected people, and may suggest novel therapies for treating *Mtb* infection. Dr. Chan is a professor of medicine and of microbiology & immunology at Einstein and an attending physician in infectious diseases at Montefiore.

Seeking the Roots of Adolescent Depression

Vilma Gabbay, M.D., and colleagues at Einstein and Montefiore have received a five-year, $4 million NIH grant to identify biological and behavioral factors predicting the duration and severity of depression in adolescents. Dr. Gabbay is an associate professor of psychiatry and behavioral sciences and in the Dominick P. Purpura Department of Neuroscience at Einstein and director of the Psychiatry Research Institute at Montefiore Einstein (PRIME). Her team hypothesizes that inflammation leads to dysregulation of reward circuitry (brain areas involved in feeling pleasure) and, eventually, to depression in adolescents. Previous research has shown that increased inflammation of the brain is associated with the inability to feel pleasure. During three sessions over two years, 120 adolescents with depressive symptoms will receive evaluations for psychiatric illness, functional MRI of reward circuitry, and blood tests for inflammation.

Insights Into TB Drug Resistance

The antituberculosis drug bedaquiline, combined with at least four other drugs, has transformed the treatment of multidrug- and extensively drug-resistant (M/XDR) TB. However, due to serious side effects, up to one-fourth of patients stop treatment early. Bedaquiline has a much longer half-life than the drugs it is combined with, so a halt in treatment means that bedaquiline persists in the bloodstream for many months, allowing TB bacteria to become resistant to it in the absence of other drugs to combat them. James Brust, M.D., was awarded a five-year, $3.6 million grant from the NIH to investigate the development of resistance to bedaquiline after therapy is interrupted. The study involves patients in South Africa with M/XDR TB and will address fundamental questions about bedaquiline pharmacology and resistance. Dr. Brust is an associate professor of medicine at Einstein and an attending physician at Montefiore. E

GRADUATING EARLY TO BATTLE COVID-19

The coronavirus crisis summons many Einstein fourth-years to work at Bronx hospitals

BY SUE BYRNE

As thousands of COVID-19 patients were pouring into Bronx hospitals last spring, dozens of fourth-year med students opted to accept Einstein's offer to let them graduate early to help battle the pandemic. There would be no restaurant celebrations or nights out with friends. Instead, many pivoted to help stressed healthcare workers cope with the increasing need for patient care at Montefiore. Here are three of their stories.

BENJAMIN LIU, M.D.
Emergency Medicine

For early Einstein graduate Benjamin Liu, the most sobering moment was the first time he signed "M.D." after his name on a death certificate. "It was a jarring experience," he says.

Dr. Liu started working on the cardiac telemetry floor of Weiler Hospital just three days after his April 17 graduation. He thought he'd already seen his fair share of death: eight patients he had helped care for during nearly two years of rotations. The telemetry floor took care of COVID-19 patients with heart conditions. The team on that floor recorded 12 deaths over the next month, and he had personally followed six of them. "Those were very tough weeks," the 27-year-old says. "It felt like the sky was falling down."

RELIEF FOR THE FRONT LINES

Dr. Liu decided to graduate early because "I felt like I had something to offer," he says. "The hospital staff was overwhelmed, and I wanted to relieve the front lines."

His emergency medicine training helped, and he had experience putting in intravenous lines, drawing blood, and doing compressions. "Moses, Weiler, Wakefield, and CHAM [Children's Hospital at Montefiore] were treating more than 900 COVID-19 cases at that time, and Weiler had about a third of them," he says. "I made the most out of a horrible situation."

He visited patients every morning, making sure they had the oxygen they needed or turning them over so that their lungs could work better. "The sad part is that there was nothing much you could do to change their prognosis," he says.

Dr. Liu hopes the pandemic will help Americans realize the importance of discussing end-of-life care. "What bothers me isn't that people die—that is always sad—but how people die and how we can make it better," he says.

Since family members were not allowed to visit, Dr. Liu's responsibilities included phoning family members daily to tell them how patients were doing. "I tried to make it clear to families what was happening, to give them the patient's realistic chances of recovery," he says. By the time patients arrived at Weiler, "they often were pretty sick and couldn't make decisions on their own," Dr. Liu says. "So part of my job was asking families what the patient would have wanted if they could speak for themselves. Some families felt if they moved to palliative care, that would be like killing their loved one. But my response to that was 'You're not killing them. The virus is.'

"As physicians with modern technology we can keep people alive for quite a long time—we artificially sustain them," Dr. Liu says. "But is that a life worth living? We don't always ask ourselves, 'When is it appropriate to stop?'"

NO REGRETS

Dr. Liu's experience with COVID-19 prompted him to get a healthcare proxy that he asked his sister to sign. "It was a weird thing to do," he says. "Getting sick myself was definitely on my mind: Will I be one of those people who do

At left, new Einstein graduate Benjamin Liu, M.D., inside Weiler Hospital last spring. Above, he takes a break outside the hospital.

Photos courtesy of Benjamin Liu, M.D.

Photos courtesy of Ana Paula Morales Allende, M.D.

Ana Paula Morales Allende, M.D., in medical scrubs, at left, and wearing a face shield over a face mask on a COVID-19 floor at Weiler Hospital last spring.

well, or not? I heard about young people who were intubated and didn't make it."

Dr. Liu is now involved in his emergency medicine rotations at Montefiore and Jacobi Hospitals. As he braces for the pandemic's possible second wave, he is glad to have helped stem the first one. "I didn't want to look back 10 years from now and say I didn't do everything I could," he says.

ANA PAULA MORALES ALLENDE, M.D.

Vascular Surgery

Before starting her first shift as a physician last April, Dr. Morales Allende was terrified. COVID-19 was a mysterious illness that kept filling intensive care beds in the Bronx.

"I knew I was taking a risk,'" she says. "It was pretty scary. Some healthcare workers had gotten sick, and I didn't know what to expect." But the newly minted Einstein graduate—born in Argentina, raised in Queens—felt compelled to be there.

"We have a large immigrant and minority population in the Bronx," she says. "I feel a great connection to them—I speak their language, I understand their culture, and I knew that people of color were being disproportionately affected by COVID-19. I wanted to advocate for them."

RISKY BUSINESS

Dr. Morales Allende completed a rotation in ambulatory medicine in mid-March, just as the pandemic began hitting the Bronx. She learned that Einstein was considering allowing fourth-years the chance to graduate early. After talking to friends, family, and professors about the risks and benefits, she decided to take the plunge.

Dr. Morales Allende quickly found herself on a COVID-19 floor at Weiler Hospital on the Einstein campus, part of a team consisting of one intern (radiology), one resident (anesthesiology), and one attending (medicine). She worked as a subintern, making rounds every morning, checking notes and labs to see how patients did overnight, examining them, and reporting back.

"Montefiore gave us a daily recap, explaining the latest protocols, what we were doing well, and what needed to change," she recalls. "They told us things like, 'This many patients were extubated today' or 'Tomorrow we are going to start giving steroids.' It was a stimulating and ever-changing environment."

BONDING WITH PATIENTS

Dr. Morales Allende especially remembers a patient she worked with for three weeks: a woman in her mid-60s with COVID-19 complicated by chronic obstructive pulmonary disease. The patient did well when first hospitalized, but later kept needing more and more oxygen. Since no visitors were allowed on COVID-19 floors, Dr. Morales Allende brought in an iPad so that the patient could communicate with her family.

"We were buddies, and I got to know her whole family after speaking to them every day," Dr. Morales Allende says. "It was just so sad when I had to tell her, 'We need to intubate you because you are getting worse.'

"I rolled in the iPad so she could tell her family what was going on. I wanted to stay hopeful and tell her she'd see her family later," she says. "But the truth about intubation was that mortality rates were high. I knew she might be saying goodbye forever." The patient was transferred to the intensive care unit and died a little more than a week later.

As Dr. Morales Allende now immerses herself in her Montefiore surgery residency, she reflects on the past several months. "Everybody is still struggling," she says. "But as much as you want to complain, it's hard to do. At least you have your health, you know?"

ALYSSA YEUNG, M.D.

Obstetrics and Gynecology

Getting sick from COVID-19 last spring made Dr. Alyssa Yeung all the more determined to battle the pandemic once she got better.

For one thing, she hoped her hard-won antibodies might protect her from reinfection. "That's still to be determined, but I did feel more comfortable with the situation because I'd already gotten sick, and I wanted to help in whatever way possible," she says. And she knew she was witnessing history and wanted to be a part of it.

EXPECTED LOSSES

In March Dr. Yeung had been completing her medicine subinternship at Jacobi Hospital before Einstein's clinical education was suspended because of the pandemic. A couple of weeks later she fell ill with a mild case of the virus herself.

When she recovered, Dr. Yeung returned to Jacobi as a volunteer subintern on COVID-19 units. Physicians from many different specialties were coming together to help deal with the flood of patients. "I was on a team with a pediatrician and an obstetrician-gynecologist," she says. "The internal medicine residents were very experienced and great at helping everyone out.

"In my first couple of days, two of my patients passed away," she says. "Neither death was unexpected—they were extremely ill and we knew what the outcome was likely to be. They just happened sooner than the team was prepared for."

Then came Einstein's offer allowing fourth-years to graduate early, and she signed up to work as a new physician on COVID-19 floors at Montefiore's Wakefield and Moses campuses.

EVOLVING PROTOCOLS

Dr. Yeung says she felt "more responsibility, and it seemed more real" when she went into the hospital after graduating. She needed to adapt to a constantly evolving situation when it came to diagnosing and treating patients. "Loss of taste and smell was something that we were hearing about early on, and then those losses became official symptoms to look for," Dr. Yeung says. "And the drug hydroxychloroquine, touted early on as a game-changer, turned out to be ineffective."

Working with COVID-19 patients, says Dr. Yeung, helped her learn about workflow and other nonclinical aspects of medicine that she hadn't focused on directly as a medical student. "I saw the additional steps involved in taking care of a patient—calling family members to update them, working with consult teams, arranging for discharge," she says. "We get a taste of those things during medical school, but we don't fully appreciate their importance until afterward."

Now beginning her residency in obstetrics and gynecology at Montefiore, she says these past months have been "one of the best learning experiences a person could possibly get. I'm fortunate to have been a part of it. Medicine is changing right in front of our eyes."

Alyssa Yeung, M.D., recovered from a case of COVID-19 last spring and quickly signed up to graduate early to work at Montefiore hospitals.

Photo by Jason Torres

Photo by Jason Torres

Ph.D. candidate Ariel Wirchnianski, center, works in the lab with M.D./Ph.D. students Ryan Malonis, left, and Robert Bortz. The three students, all sixth-years immersed in virology research, processed samples of donated blood from recovered COVID-19 patients.

EINSTEIN GRADUATE STUDENTS JOIN FORCES TO CREATE CORONAVIRUS ANTIBODY TEST

Two of them had been studying Ebola infection. Another was working on mosquito- and tick-borne diseases. But last March, all three Einstein graduate students quickly switched gears to tackle a different bug. Within weeks they were playing key roles in creating an antibody test for the novel coronavirus.

The antibody test was crucial for determining whether people had been previously infected and for evaluating whether serum from recovered patients could effectively treat patients ill with COVID-19, the disease caused by the coronavirus (page 35).

Ryan Malonis, a sixth-year M.D./Ph.D. candidate, hit the ground running: His work on chikungunya virus, which is transmitted by mosquitoes, uses some of the same technology needed to develop a coronavirus antibody test.

"This brand-new coronavirus was devastating the community around us, and very little was known about how it worked," he says. "As infectious-disease researchers, we felt a sense of duty to be a part of this effort." Mr. Malonis was working in the Michael F. Price Center for Genetic and Translational Medicine/Harold and Muriel Block Research Pavilion in the lab of Jonathan Lai, Ph.D., professor of biochemistry at Einstein.

Across Morris Park Avenue in the Samuel H. and Rachel Golding Building, Ariel Wirchnianski was developing antibody therapies against the Ebola virus in the labs of Dr. Lai and Kartik Chandran, Ph.D., professor of microbiology & immunology and the Harold and Muriel Block Faculty Scholar in Virology at Einstein. "Our labs have a lot of tools that we can use to study different viruses," says Ms. Wirchnianski, a sixth-year Ph.D. candidate. "If we could apply them to this new virus, and we could make some small difference in combating this pandemic, we wanted to try."

Robert Bortz, a sixth-year M.D./Ph.D. candidate and Ms. Wirchnianski's colleague in the Chandran lab, agrees with her. "Kartik asked who was available and willing to come in to build this diagnostic test, given that we had a limited number of people who could be in the lab, to maintain social distancing," he says. "As someone deeply interested in virology research, I was eager to help."

A TEAM EFFORT

Members of the Lai and Chandran labs first determined how best to coordinate their efforts to develop the antibody test. "It was, 'We'll do this, we'll hand it off to you, and then you will do that,'" Mr. Malonis says. His own role involved making large quantities of the coronavirus's spike protein, which the coronavirus uses to infect human cells; antibodies that do the best job of protecting against infection are those our immune systems make against these proteins. Dr. Lai explains: "Our test would use the spike protein like bait, to detect those antibodies from a patient's serum."

Both of the labs processed samples of donated blood from recovered COVID-19 patients—which came in at all hours—to separate out the serum, the part of the blood that contains antibodies.

The three students had one big advantage in developing the test: "Montefiore Health System unfortunately was at the epicenter of the epicenter of the pandemic in the United States," says Dr. Chandran. "But as a result, Montefiore was able to give us a plentiful supply of the sera we needed to validate the test."

Mr. Malonis, with others in the Lai lab, produced large quantities of spike protein by inserting a gene into cells grown in tissue culture. As soon as he could isolate and purify a batch, he would deliver it to Ms. Wirchnianski and Mr. Bortz, who would use it to test hundreds of patient-serum samples.

"As a small academic lab, this was something we were not used to," Mr. Malonis continues. "What was exciting is that it felt like we were part of a large effort at Einstein, one of many labs that were focused and determined. It was something unique that I had never experienced before in my training."

USEFUL RESEARCH

Mr. Bortz agrees. "This has been an amazing learning experience, finding out what it takes to mobilize such a huge effort, to shut everything down and then build a test for detecting antibodies against a virus we're not familiar with," he says.

The successfully validated test is now being used in Montefiore's clinical pathology lab. "That's not something we always think about on the research side," Mr. Bortz says. "It has given us a different perspective on the types of experiments we do in our day-to-day work, and makes me wonder how we can commit to being more clinically relevant or useful during a pandemic situation."

Ms. Wirchnianski says that her work on the coronavirus antibody test has helped people understand why virus research is important. "My family used to ask, 'What do you do in the lab all day?' Now that the coronavirus is mainstream news they say, 'OK, I get it. What you do is actually useful,'" she says with a laugh. E

EINSTEIN STUDENTS VOLUNTEER

When the COVID-19 crisis hit New York City in mid-March, Einstein medical and graduate students mobilized to help the Bronx cope. More than 100 fourth-year medical students opted to graduate early; more than one-third of them signed up to work in clinical settings.

Nearly 400 volunteers contributed more than 10,000 total hours ... *

- Helping at hospitals
- Answering Occupational Health Services calls
- Testing COVID-19 samples
- Caring for children, helping with homework, and pet sitting
- Delivering groceries, meals, prescriptions, and medical supplies
- Constructing face masks and face shields
- Finding and distributing donations of face masks, face shields, gloves, gowns, scrub sets, and goggles
- Assembling and distributing infant survival kits
- Performing telemedicine wellness checks

*March through May 2020

Examining Racism and Social Justice

Q&A With Drs. Nerys Benfield and Irene Blanco

Nerys Benfield, M.D., addresses those assembled on the lawn during Einstein's moment of solidarity, held June 5 in the wake of the killing of George Floyd. At right, Irene Blanco, M.D., holds a sign.

Photo by Lori Adams

In the wake of nationwide protests against police violence and systemic racism, we reached out to two Einstein leaders to get their take on these major events. Here, Nerys Benfield, M.D., M.P.H., senior associate dean for diversity and inclusion, and Irene Blanco, M.D. '04, M.S., associate dean for diversity enhancement, share their thoughts on how we at Einstein and Montefiore can help stop institutional racism.

How do you feel about the events surrounding George Floyd's death and the resulting social-justice movement?

Dr. Benfield: My overriding feeling is of being energized. It feels like there finally is momentum on many levels. The work within one institution is valuable, but structural racism needs a breadth of effort to make real change. I'm also incredibly saddened that it took something this dramatic to push the conversation back into the national space. We were here in 2014 with Michael Brown. And we were here with Rodney King [1991] and with Amadou Diallo [1999]. But I'm optimistic that there is real momentum for change. And hopefully we can sustain this.

Dr. Blanco: I agree that it is incredibly energizing to see all these millions of people who have taken to the streets, amplifying these voices and bringing light to police brutality and systemic racism. But at the same time, it is frustrating because we've been talking about this for a very long time—and in my own career for decades. Do we really have to watch someone's televised murder to galvanize people around this issue? But I am heartened by the discussions we are having on campus. I just hope we can keep moving forward and use this energy to effect positive change.

Public opinion has shifted in a very short time: Most Americans now believe that systemic racism is a real problem in this country and needs to be addressed. Have you seen a corresponding change at Einstein?

Dr. Benfield: I think what has changed is the sense of urgency. Einstein developed a diversity and inclusion strategic plan years ago. It was understood as important and valuable to the Einstein community. But now a large group is finally saying "Oh, right, it is a structural issue." But we're still on the upslope of the curve.

Dr. Blanco: Especially when we're talking about an incredibly difficult subject fraught with so much emotion. Making changes is not simply like introducing a new test for hepatitis B. You run the test, you do the numbers, it looks like a great test, you capture more patients, you implement it. This is not that. We are talking about changing

"We have to make sure our candidates understand that diversity and inclusion are central values for us."

— DR. NERYS BENFIELD

"We need to start thinking about how our research affects the community and how we teach our future scientists to advocate for those communities."

— DR. IRENE BLANCO

things that are ingrained and structural and touch every aspect of the institution. It's naïve to think there will be quick solutions.

While Einstein's faculty is more diverse than that of many institutions, can more be done to improve diversity in hiring and promotion?

Dr. Benfield: If we think about the hiring process, we should think about each step and how we can intervene. How can we ensure that our network is broad and focused on diverse candidates? Whether we are working with a search firm or doing it ourselves, we need to use an expanded network list. We also have to make sure our candidates understand that diversity and inclusion are central values for us. And we need to support junior investigators of color once they arrive, whether it be through funding, mentorships, or opportunities for program participation. And how can we hold leaders accountable for the diversity that they foster—or don't—in real ways within their departments?

What are some things Einstein is doing to change how faculty members are recruited and retained? Are there any success stories to share?

Dr. Blanco: The creation of Nerys [Benfield]'s position was an enormous success story. She has accomplished quite a bit since she started in the fall of 2019. I have the long-term perspective of having seen diversity and inclusion efforts at Einstein since I was a medical student 20 years ago. Things picked up speed when students were reacting to national events like Eric Garner's death [2014]. Students today have absolutely no qualms about putting the spotlight on what needs to change, while we were so scared—were we going to lose our scholarships? Were we going to get kicked out of school? Our students today are saying "Enough is enough." Seeing how much the students have accomplished now is mind-boggling, but their job is to be trained and then potentially leave Einstein. The onus is on us to stay and take up the flag. I hope we can move a little faster now, because there's a lot of continued, persistent work that needs to be done. This is not a sprint—it's a marathon.

How does our curriculum address social justice, which Einstein views as one of its core missions?

Dr. Blanco: How do we take things that are part of the elective curriculum and make them compulsory? All medical students must take at least an introduction to implicit-bias mitigation training during orientation. How do we make this more continuous? We do discuss the social determinants of health as they affect populations with certain diseases, but how do we think about and discuss that more broadly? And not only the medical school curriculum—how do we teach our M.D./Ph.D. and Ph.D. students to think about these issues in the context of their research? We are very much a translational school in terms of our research, right? So we need to start thinking about how our research affects the community and how we teach our future scientists to advocate for those communities.

A recent Yale study published in *JAMA Internal Medicine* reported that multiracial medical students report higher rates of mistreatment compared with white medical students. Is that also true at Einstein? If so, how has Einstein addressed this sort of discrimination?

Dr. Blanco: If we look at our diversity engagement and climate survey, we know that certain populations definitely do not feel included, particularly our Black associates and students, as well as our LGBTQ associates and students. And it's a work in progress. We need to address everything that these students are facing. Let's say that we made the most-inclusive environment in terms of the faculty and all the administrators. If students go out to an affiliate hospital and they are faced with microaggressions, that's not an inclusive environment. When you see people addressing patients in disparaging ways and you're from that community, you take it to heart, right? That faculty member is actually talking about *you*. That resident is talking about *you*. Our climate survey shows that we need to do more and we need to do better, because there are still a lot of areas where we have to make everyone feel included. If you ask our students what their opinion is about this, they're going to give it to you. They are not going to hold back. A lot of them have done community-organizing and social-activism work. They are adults and they have lived life and they have perspective. When they see something that is not true to their values that they know we can do better, they're going to tell us. E

FIND MORE ONLINE
Read more of this Q&A and watch video from Einstein's moment of solidarity:
magazine.einstein.yu.edu/justice20

Einstein students hold posters during the moment of solidarity assembly in June.

STUDENTS SEEK IMMEDIATE STEPS AGAINST SYSTEMIC RACISM

Prompted by national events over the past several months, Einstein's chapter of White Coats for Black Lives, in conjunction with the Student Collective for Action on Diversity, sent a letter in July to Einstein's leaders indicating their concerns about systemic racism, which they stressed require meaningful and immediate action.

"In order to put an end to the cyclic violence against Black Americans, we must now act to fundamentally transform the ways our society and institutions function," their letter stated. The two student groups listed specific areas for action; the letter was signed by more than 200 medical and graduate students, faculty, staff, residents, and alumni. It addressed 12 major categories for change, from antiracist training to increasing recruitment and retention of underrepresented groups among the students and faculty.

FACULTY, STAFF, AND ALUMNI ISSUE A CALL TO ACTION

In support of the Black community at Einstein and Montefiore, a letter signed by more than 300 faculty, staff, alumni, and students was sent to leaders at the two institutions in August, asking for an investment of resources to "uproot the weeds of white supremacy from medicine." The letter further stated: "The communities that we jointly serve and the communities that many of us belong to are being hit hard by two crises—COVID-19 and police violence—with the common roots of structural racism and systemic inequality."

The letter outlined a series of steps to take "in order to create truly benevolent institutions in which all students and residents can learn and thrive."

Added one anonymous signer: "Real investment in an antiracist healthcare system is long overdue and necessary."

READ MORE
Find the letters and the administration's response:
magazine.einstein.yu.edu/letters20

CONFRONTING THE COVID-19 CRISIS

Four physicians and scientists at Einstein and Montefiore spearhead coronavirus research and guide patients through a pandemic

BY GARY GOLDENBERG

Tristan Eaton (b. 1978)
Artwork commissioned by
Montefiore | Einstein, 2020

IN THE EYE OF THE STORM

Michelle Ng Gong, M.D., M.S.

In mid-March, just two weeks after the first COVID-19 case was detected in New York State, patients began flooding into Montefiore Medical Center's intensive care unit (ICU), triggering anxiety throughout the hospital. No one had seen anything like this, not even at the height of the AIDS epidemic a generation earlier.

"We started doing projections about what to expect in the days ahead," says Michelle Ng Gong, M.D., M.S., chief of the divisions of pulmonary medicine and of critical care at Montefiore and Einstein and professor of medicine and of epidemiology & population health at Einstein. "The worst-case scenario was that we had to prepare for 600 ICU patients at once—*six* times our normal capacity. Basically, we would have to turn the entire hospital into an ICU."

With the administration's support, Dr. Gong began planning for a super-sized ICU. And then things went from bad to worse. A week after treating her first coronavirus patient, Dr. Gong came down with a fever, body aches, and fatigue. She didn't need a nasal-swab test to know the diagnosis.

"My biggest worry was about infecting my family," Dr. Gong says. "I had already kicked my husband out of our bedroom by that time, and I had my own bathroom. But we live in an apartment, and everyone got sick." (She, her husband, and her two teenage sons have since recovered.)

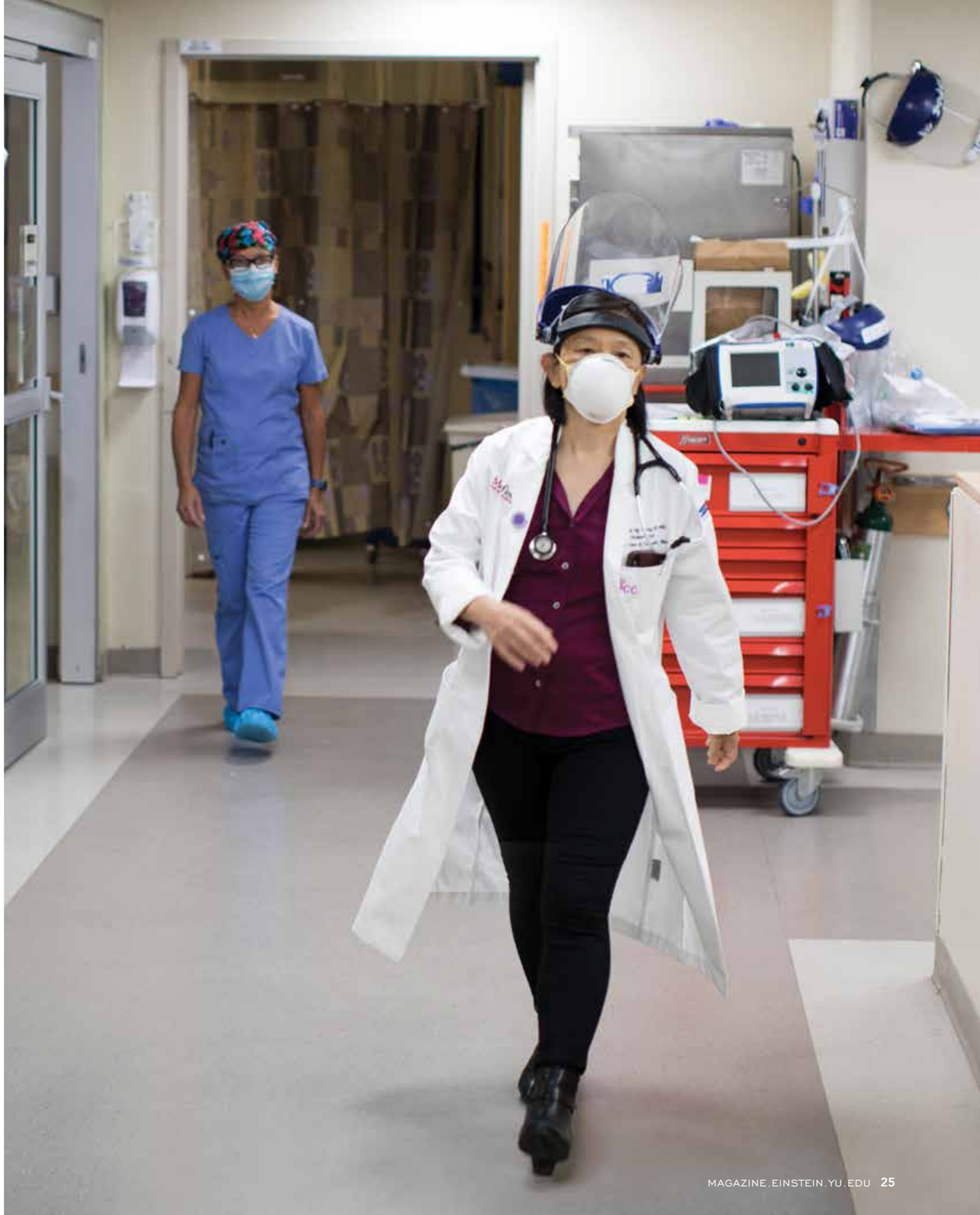
Fortified with acetaminophen and ibuprofen, Dr. Gong set up shop at home, remotely orchestrating Montefiore's efforts to scale up its ICU and consulting with clinical colleagues on the front lines. Her tasks included building a central command center where her staff could monitor and direct care for hundreds of critically ill patients on three different campuses.

"Given the limited size of our critcal-care staff, there was no other way to manage it all," she says. Ten days later, the center—with links to every ICU bedside and nursing station—was up and running in the Binswanger Auditorium on Montefiore's ground floor. "It didn't matter that I was sick," says Dr. Gong, whose fever persisted for 10 days. "Patients were rolling in nonstop. If we didn't set up the command center, many more patients were going to die."

WE'RE ALL CRITICAL-CARE DOCTORS NOW

Meanwhile, Dr. Gong recruited "everybody under the sun" to take care of patients: anesthesiologists, pediatric neurologists, cardiologists, otolaryngologists, endocrinologists, rheumatologists, gastroenterologists, and psychiatrists. Anyone who wasn't well versed in critical care soon would be. Dr. Gong returned to Montefiore after 13 days away, just as the hospital's COVID-19 caseload was peaking.

Somehow, she and her staff found time to initiate clinical trials to evaluate



Michelle Gong, M.D., en route to care for a COVID-19 patient at Montefiore.

Photos by Jason Torres

From left are respiratory therapist Sakar Alvarez Brown, Rishi Malhotra, M.D., Michelle Gong, M.D., and Phylis Lorusso, R.N.

"We were very challenged, but we were never overwhelmed."

— DR. MICHELLE GONG

three promising coronavirus medications. "Doing research is very challenging when patients are so critically ill," she says. "But we needed to find better treatments, not just for our patients but also for those in states and countries where the pandemic was just emerging. Not to have learned anything from all the lives lost in this city would be an even bigger tragedy."

Dr. Gong drew on her decades of experience participating in and leading clinical trials, several focused on preventing acute respiratory distress, the death knell for many COVID-19 patients. In a case of perfect timing, in early March she'd gone to Washington, D.C., for an international meeting of critical-care physicians. A hot topic of conversation: how to conduct research in the midst of a pandemic.

Practicing medicine in an entirely new environment posed challenges. "We got used to the physical inconveniences—the facial rashes and headaches from constantly wearing masks," says Dr. Gong. "What was worse was having to keep patients' loved ones away. Many of our care decisions depend on family meetings, and those had to be done using apps like FaceTime."

The intensity of the work took its toll, as days blurred into weeks and more and more staff members fell ill with the very virus they were trying to quell. In late April, the pandemic's emotional price was brought to the fore by news that a NewYork-Presbyterian emergency room physician had killed herself. "It hurt to the core," Dr. Gong says.

To counter the gloom and doom, members of the department of psychiatry were invited to join staff meetings and lend support. Staffers who were sickened by COVID-19 but had recuperated and rejoined the battle were awarded "purple pins" decorated with an image of the coronavirus and the word "recovered." Nurses called out "happy codes" over the intercoms to celebrate patients weaned from ventilators—an antidote to the relentless "rapid response" codes alerting the staff to patients in distress.

The number of patients in the ICU at the Moses campus finally crested at 300 in late April, a welcome relief to Montefiore's beleaguered staff. "We were very challenged, but we were never overwhelmed," Dr. Gong says. "At every stage, we were able to escalate our resources to meet the needs of patients."

BRAVERY AND HOPE

In May Dr. Gong and her team were the subject of an hour-long *CBS News* special documentary, "Bravery and Hope: Seven Days on the Front Line." In June she was given the Museum of the City of New York's Gotham Icon Award for her "heroism, selflessness, and amazing leadership" during the pandemic.

Dr. Gong doesn't want to be portrayed as the hero in this story. "I can't give enough credit to everybody who stepped up during this crisis: the administrators, the doctors, the nurses," she says. "It's so life-affirming, their dedication and selflessness. There were so many heartwarming stories, like the one of the husband and wife who were hospitalized with COVID-19 at the same time, and the nurse who arranged for them to share a room. Simple, little things like that really meant a lot."

To Dr. Gong, the biggest heroes were her critical-care and pulmonary medicine fellows. "These folks are still in training, yet they were so skilled in responding to emergencies," she says. "They functioned like full attending physicians and never lost their cool."

Asked to sum up what was learned from the crisis, Dr. Gong says: "I think we've learned a lot. We've learned how to mobilize a large system. We've learned how difficult it is to communicate across a large hospital—that's something we need to improve on. I hope that by the end of this pandemic we'll know a lot more about how to handle the next one."

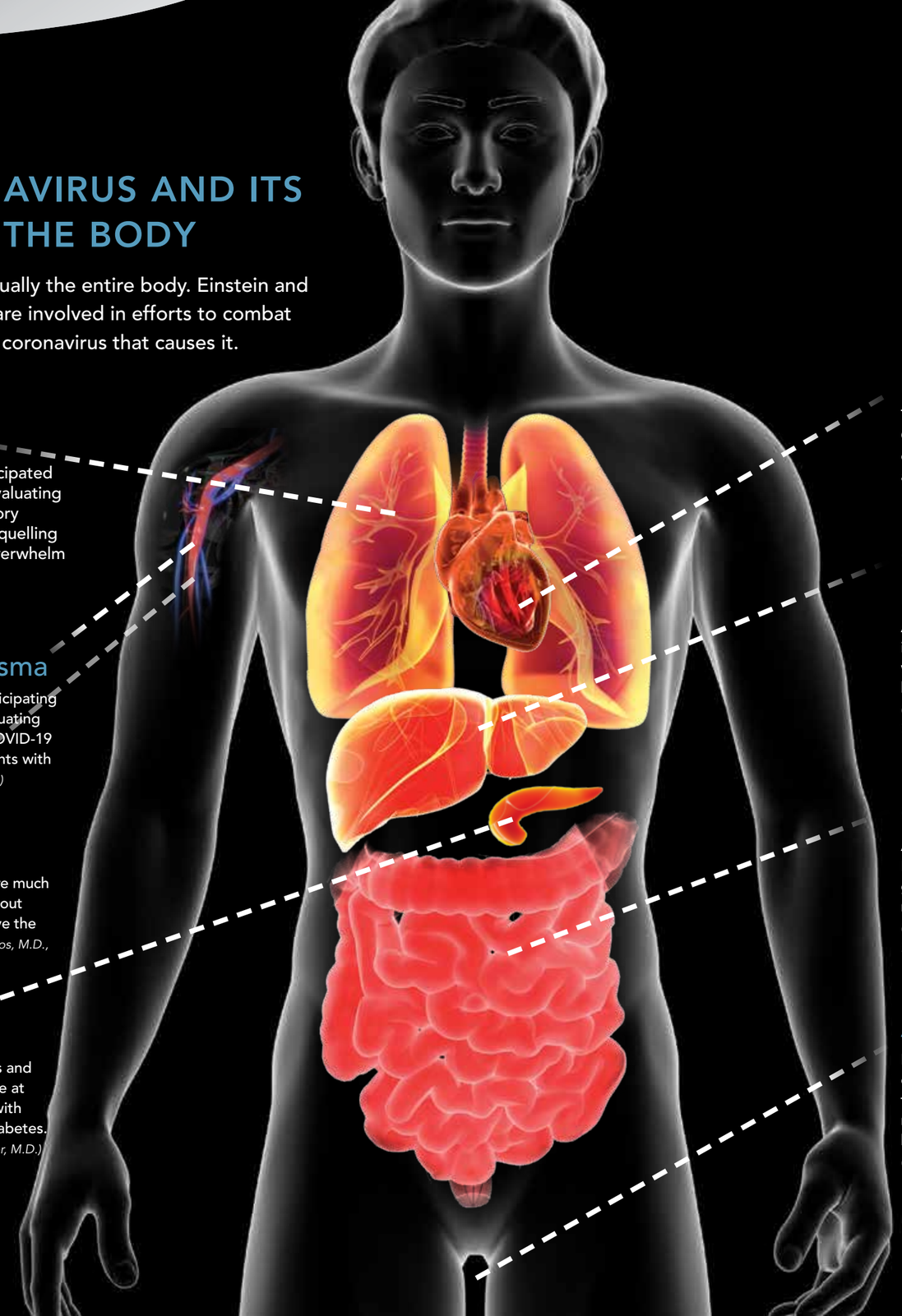
"I hope by the end of this pandemic we'll know a lot more about how to handle the next one."

— DR. MICHELLE GONG

A recovered COVID-19 patient is cheered on by Montefiore healthcare workers as he is wheeled down the hallway.

THE CORONAVIRUS AND ITS IMPACT ON THE BODY

COVID-19 can affect virtually the entire body. Einstein and Montefiore researchers are involved in efforts to combat the illness and the novel coronavirus that causes it.



Cytokine Storm

Montefiore and Einstein participated in two FDA-approved trials evaluating leronlimab, an anti-inflammatory drug that showed promise in quelling "cytokine storms" that can overwhelm COVID-19 patients' lungs. *(Harish Seethamraju, M.D.)*

Convalescent Plasma

Einstein and Montefiore are participating in a randomized clinical trial evaluating blood plasma from recovered COVID-19 patients as a treatment for patients with the disease. *(Liise-anne Pirofski, M.D.)*

Cancer

COVID-19 patients with cancer are much more likely to die than those without cancer; blood-cancer patients have the highest mortality rate. *(Balazs Halmos, M.D., M.S., and Amit Verma, M.B.B.S.)*

Diabetes

COVID-19 patients with diabetes and who are obese and use insulin are at greater risk of dying compared with other COVID-19 patients with diabetes. *(Shivani Agarwal, M.D., and Yaron Tomer, M.D.)*

Heart Attacks

The COVID-19 pandemic in New York City caused a surge in out-of-hospital cardiac arrests and deaths during March and April 2020. *(David Prezant, M.D.)*

C-Reactive Protein (CRP)

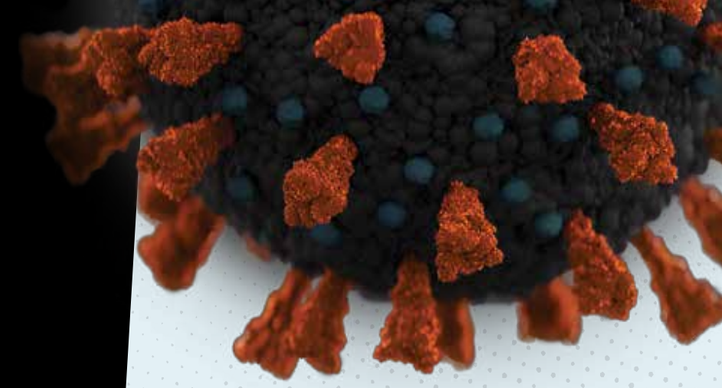
A common blood test, for the inflammatory biomarker CRP, identifies which COVID-19 patients will benefit or be harmed by steroid treatment. *(Marla Keller, M.D., Shitij Arora, M.B.B.S., and WIlliam Southern, M.D.)*

Gut Microbiome

An ongoing study of 16,000 Hispanics/Latinos is investigating whether the gut microbiome influences the body's response to the novel coronavirus. *(Carmen R. Isasi, M.D., Ph.D., and Robert C. Kaplan, Ph.D.)*

ACE2 Receptors

Men have more trouble clearing the coronavirus and have worse outcomes than women, perhaps because ACE2 receptors to which the virus binds are highly expressed in the testes. *(Aditi Shastri, M.B.B.S.)*



VIRUS–FOCUSED RESEARCH

GALIDESIVIR

An antiviral compound discovered at Einstein is being evaluated as a treatment for COVID-19 patients in a randomized, double-blind clinical trial in Brazil. *(Vern Schramm, Ph.D.)*

REMDESIVIR

Montefiore participated in two multicenter, randomized, double-blind clinical trials evaluating the antiviral drug remdesivir: (1) remdesivir vs. placebo; (2) remdesivir plus the anti-inflammatory drug baricitinib vs. placebo. *(Barry Zingman, M.D.)*

ANTIBODY TEST

Einstein and Montefiore scientists developed an antibody test showing whether someone was exposed to the coronavirus. *(Kartik Chandran, Ph.D., Jonathan Lai, Ph.D., Amy Fox, M.D., M.S., and Michael Prystowsky, M.D., Ph.D.)*

A 'SAFE' CORONAVIRUS FOR STUDY

Einstein scientists transferred the gene for the coronavirus' spike proteins into the relatively harmless vesicular stomatitis virus (VSV), causing spikes to sprout from VSV's surface. *(Kartik Chandran, Ph.D., and Rohit Jangra, Ph.D.)*

ORGANIZING FOR THE ONSLAUGHT

Yaron Tomer, M.D.

The past few months have been a bit of a blur for Yaron Tomer, M.D., but one date in particular stands out: March 24, 2020. "That day, our population health experts informed us that, at current admission rates, our health system would soon be overwhelmed with COVID-19 cases, and we wouldn't have enough doctors, nurses, ventilators, or protective equipment to properly care for every patient with the disease," recalls Dr. Tomer, who is the chair of medicine at Einstein and Montefiore and a professor of medicine and of microbiology & immunology and the Anita and Jack Saltz Chair in Diabetes Research at Einstein.

Adding to his concern, March 24 was also when Dr. Tomer was diagnosed with COVID-19. "My wife, son, and daughter also tested positive," he says. "We all came down with a mild fever and back pain and temporarily lost our sense of smell. But given what I've seen in the hospital, we were extremely lucky."

THE THREE C'S

In the last week of March, more than 650 COVID-19 patients were admitted to Montefiore Health System, and the numbers were increasing exponentially. To make things worse, critical-care director Michelle Gong, M.D., was already sickened by COVID-19 (page 24). That meant that two of Montefiore's top physicians were quarantined and working remotely during this crucial week—far from ideal for a hospital facing the largest crisis in its 138-year history. Fortunately, before the pandemic reached the Bronx, Dr. Tomer had devised and implemented a "Three C Teamwork" plan for handling the crisis: coordination, communication, and collaboration.

In a nutshell, his approach aimed to ensure that his thousand-member department of medicine (DOM), by far the hospital's largest, coordinated its COVID-19 efforts, that leadership communicated with frontline staff, and that the department collaborated with other parts of the health system.

To achieve the first C—coordination—Dr. Tomer assembled a departmental COVID-19 task force, consisting of 18 representatives from all arms of the DOM. The task force convened every morning via conference call for weeks.

Communication was achieved through a daily electronic newsletter—a potpourri of news and information about COVID-19 treatment protocols and clinical trials, links to salient papers, useful resources such as housing and parking information, and statistics on how the hospital was handling the pandemic. "My motto was that whatever I know about COVID-19 at Montefiore, everybody should know," Dr. Tomer says.

More than 7,000 staff members and alumni received the newsletter, as did a sizable number of outside clinicians and hospital administrators. In addition, the department's treatment protocols were disseminated through an online folder and a smartphone app. "Those tools were constantly updated with the latest guidelines, and this improved outcomes," Dr. Tomer says.

Collaboration involved the entire medical center. "COVID-19 is a medical disease, but we couldn't double the size of our medical service and triple the size of our intensive-care units without help from departments throughout the hospital," he says. "We did not do anything alone."

Yaron Tomer, M.D., who recovered from COVID-19, prepares to donate plasma.

FLATTENING THE CURVE

Montefiore's frontline workers were anxious about becoming infected and bringing the virus home to family members, and rightly so—nearly one in five residents tested positive for COVID-19. But they had an even bigger concern. "As I met with the hospital's doctors and nurses," Dr. Tomer says, "their number one worry was that we'd have to ration healthcare, as had happened in Europe. They were asking, 'Will we have to decide who gets admitted to the hospital, or who will get a ventilator? Will we have to make such decisions?'"

It didn't come to that, thanks to New York City's lockdown and social-distancing measures, which gradually flattened the curve of the pandemic, and because Montefiore's clinicians got better at managing patients.

"COVID-19 is not like any disease we have seen before," Dr. Tomer says. "This is not just a serious viral pneumonia that sometimes affects other organ systems. This virus directly harms almost every system in the body, including the lungs, the heart, the brain, and the intestines. While we couldn't get rid of the virus, we learned that we could save lives by taking care of the complications and giving the immune system time to clear the virus."

> "This virus directly harms almost every system in the body."
>
> — DR. YARON TOMER

Montefiore physicians were directly responsible for several COVID-19 clinical advances. One example was the use of steroids to quell the often-fatal inflammation caused by the immune system's overzealous response to infection.

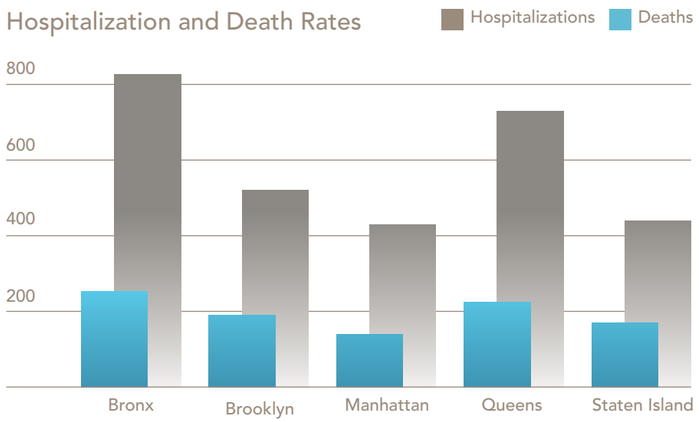
"The Centers for Disease Control and Prevention and two medical societies had warned against using steroids in COVID-19 patients, based on their harmful effects in SARS patients," Dr. Tomer says, referring to the coronavirus that plagued China in the early 2000s. "But one of our attendings, Shitij Arora, M.B.B.S., had a patient who was doing very poorly, and he gave her steroids as a last resort. The patient recovered. Dr. Arora subsequently tried it on four other critically ill patients, and all responded."

Dr. Tomer and his team concluded that steroids such as prednisone were beneficial for COVID-19 patients with low oxygen levels and signs of severe

inflammation. So in early April they issued a new steroid-treatment protocol, which was communicated throughout Montefiore and to other institutions.

"We now know from a large clinical trial in the United Kingdom that we did the right thing," Dr. Tomer says. "That trial found that dexamethasone, another steroid drug, reduces mortality by 20% to 30% in patients." Montefiore's own study during the pandemic found that steroids reduce mortality by nearly 80% in COVID-19 patients with the highest level of inflammation.

Montefiore physicians also devised and disseminated COVID-19 protocols for the treatment of potentially deadly blood clots and for ketoacidosis, a severe complication of diabetes seen frequently in COVID-19 patients (page 51).



During the time in early 2020 when New York City was nearly overwhelmed by the COVID-19 pandemic, the Bronx was the most heavily affected borough with respect to both hospitalizations and deaths, expressed in this graph as rates per 100,000 residents. Source: New York City Department of Health

DIFFERENT OUTCOMES FOR DIFFERENT RACES

COVID-19 has highlighted certain strengths of the healthcare system—its ability to adapt quickly when confronted by a new and catastrophic disease, for example—but also revealed glaring weaknesses, such as racial disparities in health outcomes.

"I think the level of care that people got here in the Bronx wasn't any different than in other regions," Dr. Tomer says. "If anything, it was superior. But the Bronx was hit particularly hard by the pandemic, with Blacks and Latinx hospitalized at nearly twice the rate of whites. One reason is the inadequate access to care for chronic diseases such as diabetes, hypertension, and kidney disease—major risk factors for becoming severely ill or dying from COVID-19.

"If there's anything good that can come from this," he adds, "I hope the pandemic emphasizes the urgent need to eliminate the health disparities that have existed for decades, if not centuries."

PRESCRIPTION FOR THE FUTURE

Now that this pandemic seems to be easing, at least in New York, Dr. Tomer is already thinking about and preparing for the next one. "The main lesson from COVID-19 is to let the scientists, not the politicians, lead the response to epidemics," he says. "Public health and individual health should take precedence over everything else."

A second lesson is the need to plan ahead, just as we do for nuclear disasters and earthquakes. "For pandemics," Dr. Tomer says, "I would recommend a plan for storing and distributing personal protective equipment, and for developing capabilities for creating test kits that can be mass-produced quickly. We also need to establish the infrastructure needed for rapidly manufacturing vaccines against known and emerging pathogens. Pandemics are no longer a once-every-hundred-years phenomenon, but instead can be expected every 10 or 20 years, and we need to plan accordingly."

In addition, many survivors of COVID-19 will still need help. "We have to address the challenges faced by thousands of patients who've recovered from COVID-19 but are still suffering from complications," Dr. Tomer says. "So we've created our COVID-19 Recovery Clinic, where they can be cared for by a multidisciplinary team of experts."

Dr. Tomer has also been thinking about the future of postpandemic medical education. "Since physician training is taught at the bedside, it will probably change less than other aspects of healthcare," he says. "There will certainly be more remote and virtual learning, but mastering the key aspects of care—speaking to patients, examining and diagnosing them—cannot be simulated by any program or machine. That's why I and so many others became doctors in the first place, for those human interactions. That's the beauty of medicine."

SPIKING THE CORONAVIRUS

Kartik Chandran, Ph.D.

Kartik Chandran, Ph.D., feared this day would come. "After the SARS, MERS, and H1N1 virus-caused outbreaks, it seemed only a matter of time until we had a global viral pandemic," he says. "The only questions were what agent would cause it and under what circumstances."

During his years of doctoral and postdoctoral training, Dr. Chandran had mastered the skills for succeeding in academic research, from designing experiments to writing grants to publishing papers. Now he needed to learn how to run a lab from home—in the middle of a pandemic he had known was inevitable.

For Dr. Chandran, professor of microbiology & immunology and the Harold and Muriel Block Faculty Scholar in Virology at Einstein, the connection to COVID-19 began in late January, when the first cases of COVID-19 were reported in the United States. "At the time, government leaders and public health officials were giving mixed messages about COVID-19, saying it was similar to the flu," he recalls. But as a virologist who works with some of nature's most notorious pathogens, he wasn't persuaded.

"People were immunologically naïve to the virus responsible for COVID-19 and therefore had no real protection against infection," he notes. In late February, when the first cases of community spread came to light, he and his wife began to socially distance from neighbors and friends and to stockpile supplies for a lengthy stay in their Brooklyn home. They withdrew their son from his private school and helped persuade its administrators to shut it down before it had a single case, weeks before public schools in the city did the same.

"For my lab, the signal moment was the third week of February, when several of us were supposed to go to a conference in San Diego," he continues. "I cancelled our travel plans. A week later, I told my staff that I would be working from home and that they could do so as well."

Socially distanced but electronically connected, Dr. Chandran began collaborating on a variety of COVID-19 studies. "Most of the work was done by my 'COVID Crew'—the students in my lab who went in to work on all the COVID-19 projects," Dr. Chandran says. (See "Einstein Graduate Students Join Forces," page 16.)

> "People were immunologically naïve and had no real protection."
>
> — DR. KARTIK CHANDRAN

TESTING ANTIBODIES

The first priority was an urgently needed antibody test. Montefiore was using convalescent plasma (obtained from patients who'd recovered from COVID-19) as a treatment for the disease and needed a test to ensure that donated plasma was rich in antibodies. (See "Old Treatment Takes On a New Pandemic," facing page.)

Such a test would also allow Montefiore to determine whether staff members exposed to the virus had mounted an immune response and might therefore safely be able to return to work. And an in-house test would increase testing capacity and provide backup in case commercial antibody tests were found to have problems.

The antibody test developed by Dr. Chandran, Jonathan Lai, Ph.D., and their teams looks specifically for antibodies against the virus's spike proteins, which protrude from the viral surface and enable the virus to infect human cells. (Dr. Lai is a professor of biochemistry at Einstein.)

'DEFANGING' A VIRUS

You've heard of a "wolf in sheep's clothing." Dr. Chandran's team created the opposite: a "sheep in wolf's clothing" virus that behaves just as the novel coronavirus does but is much safer for scientists to study in the lab.

The coronavirus infects cells via its surface spike proteins, which enable the virus to latch onto and enter cells. Dr. Chandran and his colleague Rohit Jangra, Ph.D., research assistant professor, transferred the coronavirus spike-protein gene into a relatively harmless virus called vesicular stomatitis virus (VSV), causing spikes to sprout from VSV's surface.

By infecting cells in precisely the way the coronavirus does, this safer, genetically engineered version could help scientists develop drugs that block infection and protect against disease.

SEQUENCING THE VIRUS

"Other groups around the country have sequenced the coronavirus, but not here in the Bronx," Dr. Chandran says. "The genetics of SARS-CoV-2—the official name of the novel coronavirus—is constantly evolving, and it's conceivable that we could learn something new about it from the strains circulating here. Our preliminary data suggest that the virus arrived in the Bronx from all over the world, not just from the West Coast of the United States or from China, which tells us something about the epidemiology of the disease." Dr. Chandran's team is analyzing the antibodies of dozens of recovered COVID-19 patients who will provide blood samples at regular intervals for up to a year.

MAKING ANTIBODIES

In potentially his most consequential COVID-19 project, Dr. Chandran is developing a monoclonal antibody (mAb) therapy for COVID-19 patients. It's a turbocharged version of convalescent-plasma therapy.

Convalescent plasma contains many different antibodies against the coronavirus, some of which neutralize it much better than others. Monoclonal antibody therapy is much more focused: the result of screening plasma from hundreds of recovered COVID-19 patients, finding the one or two antibodies that do the best job of neutralizing the coronavirus, and then manufacturing those antibodies in great quantities.

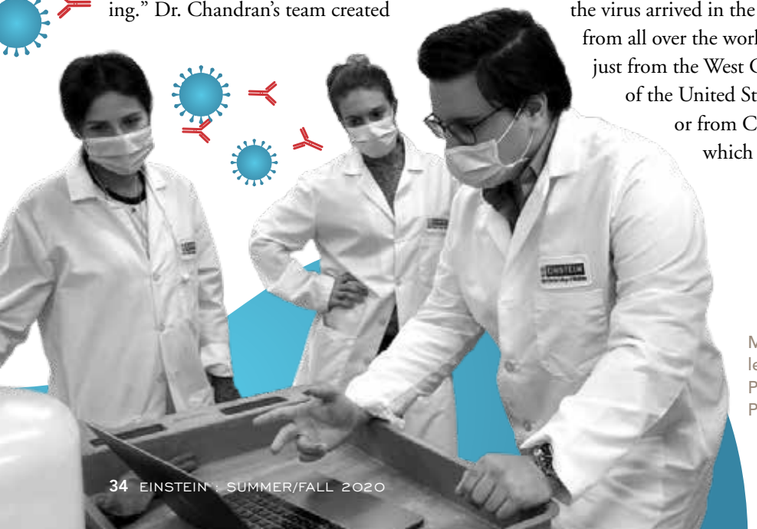
As part of the Prometheus Consortium—five institutions collaborating to develop antibody-based therapies against viruses—Dr. Chandran's team has evaluated hundreds of antibody candidates and identified several that powerfully neutralize SARS-CoV-2.

READ MORE

Find out how the antibody test was created, and learn more about the surrogate coronavirus.

magazine.einstein.yu.edu/antibody20

magazine.einstein.yu.edu/surrogate20



Members of Dr. Chandran's lab at work, from left: Catalina Florez, Ph.D., Eugenia Dieterle, Ph.D., and Robert Bortz, sixth-year M.D./Ph.D. student.

OLD TREATMENT TAKES ON A NEW PANDEMIC

Liise-anne Pirofski, M.D.

Early in the pandemic, as doctors scrambled to find some way to treat patients infected by the novel coronavirus, Liise-anne Pirofski, M.D., chief of infectious diseases at Einstein and Montefiore, had a eureka moment.

"For my entire medical career, I've been interested in antibodies and how they bolster the immune response," recalls Dr. Pirofski, who is also a professor of medicine and of microbiology & immunology and the Selma and Dr. Jacques Mitrani Chair in Biomedical Research.

"Studying art history in college, I was particularly intrigued by medically related images, such as renditions of the dance of death and of people ravaged by plague. COVID-19 conjured up thoughts of antibodies, plagues, and convalescent plasma, which had shown promise against pandemic plagues such as influenza and SARS. Historic uses of convalescent plasma led to a *Journal of Clinical Investigation [JCI]* article, which helped kick everything off," she says.

Plasma, or sera, is what remains when red and white cells are removed from blood: a yellowish liquid containing water, salt, enzymes, and antibodies. Convalescent plasma is taken from people who have recovered from an infection and then transfused into patients suffering from the same infection. In contrast to vaccination, convalescent plasma could offer immediate immunity by providing antibodies that patients need to fight off microbial infections.

Dr. Pirofski collaborated on the *JCI* article with her longtime Einstein colleague Arturo Casadevall, M.D., Ph.D., who now chairs the department of molecular microbiology and immunology at Johns Hopkins. Their widely publicized article, published March 15, alerted the world to convalescent plasma—an old and all-but-forgotten therapy with the potential for saving lives today.

"We recommend that institutions consider the emergency use of convalescent [plasma] and begin preparations as soon as possible. Time is of the essence," Drs. Pirofski and Casadevall wrote in *JCI*. "In the early 20th century, convalescent [plasma] was used to stem outbreaks of viral diseases such as poliomyelitis, measles, mumps, and influenza," the authors wrote, noting that the therapy fell out of favor with the advent of antimicrobial therapy in the 1940s but never completely disappeared. It recently showed promise against two other coronavirus-caused outbreaks (SARS1 in 2003 and MERS in 2012), as well as the 2013 West African Ebola epidemic.

> "COVID-19 conjured up thoughts of antibodies, plagues, and convalescent plasma."
>
> — DR. LIISE-ANNE PIROFSKI

NY Hero

"Although every viral disease and epidemic is different, these experiences provide important historical precedents that are both reassuring and useful as humanity now confronts the COVID-19 epidemic," the researchers added.

MAKING PLASMA ACCESSIBLE

"The pandemic allowed me to study the effectiveness of antibodies in people," Dr. Pirofski says. But her first priority was trying to make convalescent plasma available to the many patients for whom it might mean the difference between life and death.

By late March, a national convalescent plasma advisory group (led by Dr. Casadevall and the Mayo Clinic's Michael Joyner, M.D., and including Dr. Pirofski) had convinced the U.S. Food and Drug Administration to designate convalescent plasma as an investigational new drug, allowing physicians to administer it to seriously ill COVID-19 patients on a "compassionate use" basis outside clinical trials.

The resulting U.S. Convalescent Plasma Expanded Access Program has proven extremely popular. As of late August, the program had administered plasma to more than 70,000 patients nationwide. In a call with governors on August 3, U.S. Health and Human Services Secretary Alex M. Azar II said that demand for plasma was exceeding the supply.

Dr. Pirofski directed the expanded-access program at Montefiore along with co-investigator Hyun Ah Yoon, M.D., and was part of its national leadership group. They treated 103 severely ill COVID-19 patients at Montefiore with convalescent plasma and compared their outcomes to those of patients in a retrospective control group. The study,

Johanna Daily, M.D., M.S., at right, and her team helped recruit hundreds of convalescent-plasma donors. Dr. Daily is a professor of medicine and of microbiology & immunology at Einstein and an infectious-disease specialist at Montefiore.

now being reviewed for publication, found that convalescent plasma appeared helpful, especially for younger patients treated early in the course of the disease—a confirmation of past experiences with the therapy.

Other researchers recently published a "safety update" on the program's first 20,000 patients treated under the expanded-access program. "That study showed that convalescent plasma is very safe, with an incidence of serious adverse effects similar to standard plasma used in hospitals every day," Dr. Pirofski says.

GOING FOR THE GOLD

Randomized controlled trials (RCTs) are medicine's gold standard: the only way to conclusively show whether a therapy is effective. Despite its more than 100 years of use, convalescent plasma for a pandemic disease has never been evaluated in large RCTs; hence the importance of establishing its effectiveness against COVID-19. Helpful though it may be, the expanded-access program lacked the necessary control group. Dr. Pirofski wanted to settle the matter.

On April 17, she helped launch a convalescent-plasma RCT involving Einstein-Montefiore, NYU Langone Medical Center, and the Yale University School of Medicine, a group that has recently been expanded to include the University of Miami and the University of Texas–Houston. The Einstein-Montefiore study was launched with a $300,000 gift from the G. Harold and Leila Y. Mathers Foundation and $200,000 in emergency funding from Montefiore Health System; Dr. Pirofski, along with Marla Keller, M.D., later received a $4.3 million National Institutes of Health grant to support the trial.

Plans for the Einstein-Montefiore trial called for studying 300 hospitalized patients with COVID-19 who had respiratory signs and symptoms, half to receive convalescent plasma and the other half a placebo. But recently, recruitment has fallen off. Success in controlling the pandemic in the area has reduced the number of patients who qualify. As of mid-August, 185 patients had been enrolled in New York City and the Bronx.

It's a national problem as well: other RCTs evaluating convalescent plasma in the United States have so far recruited fewer patients than expected as the pandemic has moved to new areas.

To gain insight into plasma's possible effectiveness, Dr. Pirofski and colleagues conducted a meta-analysis on data pooled from 12 RCTs and other studies from around the world, involving a total of 804 patients. Their study, posted as a preprint on July 30 to *medRxiv*, found that convalescent plasma reduced mortality rates for patients treated with it by 57% compared with those for untreated patients.

Meanwhile, in an approach described recently in *JAMA*, other researchers plan to continuously pool and monitor data being generated by at least 10 incomplete and still-active RCTs. "It requires some innovative statistical techniques, but this project has the potential for reaching scientifically valid conclusions about plasma once enough data have been collected," Dr. Pirofski says.

What will be the verdict? "Everything we've learned so far indicates that convalescent plasma is safe—certainly no riskier than a blood transfusion," says Dr. Pirofski. "As for effectiveness, we won't know for sure until the RCTs have spoken—which I hope will happen soon."

The need for an effective COVID-19 treatment—and for health improvements in general—is especially urgent in the Bronx, Dr. Pirofski says. "For far too long, the health of poor communities has not received sufficient recognition or resources," she says. "Here in the Bronx, we see how this has led to the pandemic's devastating effect on Hispanics and African Americans, due mainly to underlying health conditions that have gone untreated. What gives me hope is that, as physicians and scientists, we have the ability to make things better for people in these communities and alleviate some of the suffering."

COMPARISONS WITH AN EARLIER EPIDEMIC

For Dr. Pirofski, the COVID-19 pandemic has echoes of her experience more than 30 years ago, as a young resident on a Bellevue Hospital ward where more than a quarter of the patients were suffering from AIDS. "Taking care of those patients was a devastating experience," she recalls. "There was the same helpless feeling of being overwhelmed, of patients with labored breathing withering away and dying because we couldn't change the course of their disease.

"But compared with AIDS back then," she continues, "we've known about COVID-19 for a very short time—only about eight months—and yet we've learned much more about how COVID-19 occurs and how it's transmitted, and we're taking better care of our patients." E

MORE ONLINE
Get up-to-date coverage of Einstein and Montefiore's response to COVID-19:
magazine.einstein.yu.edu/pandemic20

> "What gives me hope is that we have the ability to make things better for people."
>
> — DR. LIISE-ANNE PIROFSKI

WOMEN IN UROLOGY

Female role models at Einstein and Montefiore are inspiring women to consider this specialty

BY NANCY METCALF

When she was a medical school student, Laena Frechette, M.D., thought she had a pretty good idea of what urologists looked like (male) and what sorts of ailments their patients had (prostate problems and urination difficulties). Then, during her third year at Einstein, she started her surgery rotations at Montefiore. She discovered that urology is not at all limited to treating older men—instead, about 30% of all adult patients nationwide are women. She also found that female mentorship matters.

"I ended up meeting so many empathetic female urologic surgeons here that it made it easy to envision myself as a urologist," she says. After graduating from Einstein this past May, Dr. Frechette entered a urology residency program at the University of Rochester Medical Center—one of two women from Einstein's Class of 2020 who chose the specialty. "I was used to seeing so many women on the faculty who were urologists that I thought it was normal," she says. "I learned in my interview season how rare that is. Something really special is happening at Einstein and Montefiore."

AHEAD OF THE CURVE

Women make up just under 10% of practicing urologists nationwide, according to a 2019 report by the American Urological Association—but at Einstein and Montefiore, they represent more than 40% of urology department physicians.

"I'm incredibly proud of the fact that there's greater gender balance in our department," says Mark P. Schoenberg, M.D., professor and chair of urology at Einstein and Montefiore. The institution where he worked before coming to the Bronx in 2014 "was essentially all male, and I can tell you the vibe was very different."

Amanda C. North, M.D., associate professor of urology at Einstein and a practicing urologist at Montefiore, points out that women now make up more than 50% of enrolled medical students nationwide, according to 2019 data from the Association of American Medical Colleges. "If we want the very best practitioners," says Dr. North, "then we should strive for that percentage among urologists."

A SURGICAL SPECIALTY—PLUS

In her practice, Beth Drzewiecki, M.D., associate professor of urology at Einstein and a clinical urologist at Montefiore, spends about half her time in the operating room and the other half caring for clinic patients. "Surgeons want to fix things, and I think most of us consider ourselves surgeons first," she says. "But we're also able to treat patients nonsurgically."

While Allison Grant, M.D., was doing her clerkship at Montefiore, she found this spectrum of treatment approaches appealing. "Say you go to your internist, who says you have a high cardiovascular risk score," she says. "The internist sends you to a cardiologist, who does evaluations, tests, and procedures. And then separately there are cardiac surgeons for those who need heart surgery. But in urology, you do it all."

Dr. Grant, who like her best friend Dr. Frechette graduated from Einstein in May, says her clerkship experience helped her decide to make urology her career. She entered a urologic residency program at NewYork-Presbyterian

OPPOSITE PAGE: Amanda North, M.D., works with a pediatric patient at Montefiore Medical Center in the Bronx. ABOVE: Einstein graduates Allison Grant, M.D., left, and Laena Frechette, M.D., best friends since their undergrad days at Cornell University, take a break on the last day of their urology residency interviews.

"We have significantly increased our knowledge of how to approach patients."

— DR. BETH DRZEWIECKI

"During my residency, whenever I had a female patient, she'd say, 'Oh, I'm so relieved to see a woman!'"

— DR. NITYA ABRAHAM

"I'm incredibly proud of the fact that there's greater gender balance in our department."

— DR. MARK P. SCHOENBERG

Hospital's Columbia campus this past summer.

Urology also stands out because it encompasses diverse health issues. "A small segment of problems in urology is very male-specific—prostate cancer, erectile dysfunction, testicular problems—and a lot of pediatric urology is also male-dominated, because there are more parts to go wrong for boys," Dr. Drzewiecki notes. "But men and women share many other urologic problems, including bladder and kidney cancer, kidney stones, and blood in their urine."

Studies of urologic-practice patterns show that women perform more female-specific procedures than men, and men more male-specific procedures than women. In addition, women are more likely to subspecialize in female or pediatric urology.

Nitya Abraham, M.D., associate professor of urology at Einstein and a urologist at Montefiore, specializes in female pelvic medicine and reconstructive surgery. "During my residency, whenever I had a female patient, she'd say, 'Oh, I'm so relieved to see a woman!' I almost felt obligated to pursue this as a subspecialty because it provided my female patients so much comfort," she says.

Dr. Schoenberg noted that Dr. Abraham's area of expertise "is the fastest-growing specialty in urology" as women become more aware that treatments exist for age-related problems such as pelvic organ prolapse and urinary incontinence. Dr. Abraham says that women had been reluctant in the past to get these problems addressed because "they thought it was just a part of getting old. Men, on the other hand, wanted erectile dysfunction addressed right away."

One patient, a 64-year-old Orthodox Jewish woman from Brooklyn, says she came to Dr. Abraham after a different surgeon tried to repair her prolapsed vagina and bladder but failed. "I sometimes couldn't urinate and had to have a catheter," says the woman, who asked to be identified only as "Mrs. A."

Dr. Abraham performed a successful repair and made the patient feel completely at ease. "It makes a very big difference having a woman urologist," Mrs. A. says. "I'm religious, and it feels more comfortable with a lady around. She was very, very nice and calming. She gave me a lot of support."

UROLOGY AND CHILDREN

Three of Einstein and Montefiore's 17 urologists specialize in pediatric urology (two are women), and the demand is so great that the medical school and health system are looking to hire a fourth.

"Our obstetrics and gynecology department has outreach clinics all over the Bronx and into Westchester County, and it funnels cases to us through maternal-fetal medicine," says Dr. North, who focuses on congenital disorders of the urinary tract. "I probably see one or two prenatal cases a week."

The most common condition she encounters is hydronephrosis, or fluid in the kidneys. The condition usually rights itself during fetal development, "but the rest of the time babies need more intervention, possibly surgery, soon after birth."

Other conditions that pediatric urologists commonly fix are hypospadias, in which the urethra comes out on the underside of a baby's penis instead of at the tip, and orchiopexy, where undescended testicles must be moved into the scrotum.

Among Dr. North's most fulfilling recent cases was that of a 5-year-old girl whose parents brought her to Montefiore's pediatric urology clinic because she was constantly wetting her pants. "I saw that she was dripping urine and knew exactly what was going on," Dr. North says. "A sonogram showed that the ureter from her right kidney was draining into her vagina instead of her bladder. We moved it where it belonged, and after her surgery she proudly showed me her new princess underwear. That family was so grateful—they thought it was all in her head."

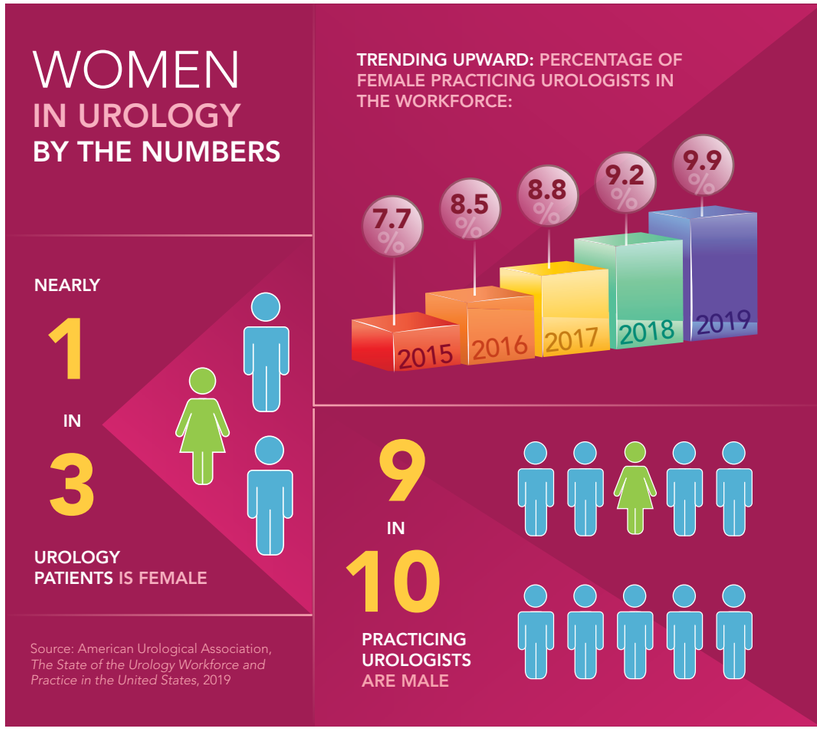
Pediatric urologists also perform a surprising number of circumcisions on older children, many from the Bronx's large Bengali community. "In Bangladeshi culture circumcision is done right before puberty," Dr. North says, "so I end up doing many of them on children who are ages 8 to 10."

Another practice area is the treatment of babies born with various intersex conditions, a focus of Dr. Drzewiecki's practice. "It is a very controversial subject right now—bodily autonomy and performing operations on children who have no say in them," she says. "We have significantly increased our knowledge of how to approach patients. I would never, ever force surgery on any family who wasn't prepared for it or didn't understand the implications." Accordingly, she works with a multidisciplinary team of endocrinologists, geneticists, and psychologists.

A CHALLENGE OVERCOME

Surprisingly, Drs. Abraham, Drzewiecki, and North say that they haven't run into much resistance from male patients. "I feel men end up being more comfortable speaking about urology issues to a woman," Dr. Drzewiecki says.

All three spoke of their joy in being able to "offer treatment that can be so life-changing for people." As Dr. North recalled: "The chairman who trained me used to say, 'There are no unhappy urologists because we make people feel better.'" E



TYPE 1: THE OTHER DIABETES

BY GARY GOLDENBERG

The autoimmune disease is increasing at an alarming rate. Einstein and Montefiore scientists are addressing it on a number of fronts.

Sam (not his real name) was diagnosed with type 1 diabetes in his early teens. He struggled to follow the insulin regimen needed to control his blood-glucose level, even after experiencing diabetes-related complications that required hospitalizations. Finally, in his late 20s, Sam started handling self-management for his diabetes, but his effort came too late to prevent permanent disability.

All too many people with type 1 diabetes (T1D)—especially adolescents and young adults—fail to reach target blood-glucose levels. The elevated glucose forms toxic compounds that damage tissues, leading to potentially devastating consequences that occur in T1D as well as type 2 diabetes: diabetic coma, blindness, heart disease, kidney failure, nerve damage, and amputations.

"People talk about the type 2 diabetes epidemic—and it is certainly a major public health issue," says Yaron Tomer, M.D., who is the chair of medicine at Einstein and Montefiore and a professor of medicine and of microbiology & immunology and the Anita and Jack Saltz Chair in Diabetes Research at Einstein. "But type 1 diabetes is much more common than people think. Since World War II, the frequency of type 1 has doubled every 20 years in almost every population group, and nobody knows why" (page 47).

COMING OF AGE WITH T1D

As Sam's story suggests, controlling blood-glucose levels poses particular problems for young people with T1D. A key goal is keeping their A1C levels (the standard measure of long-term blood-glucose control) within certain parameters. Researchers, however, estimate that between 85% and 90% of teens and young adults with T1D nationwide do not regularly meet their target A1C levels—a red flag for complications to come.

"Managing type 1 diabetes requires constant vigilance—counting carbs, testing your blood sugar, and injecting insulin at every meal," says Shivani Agarwal, M.D., M.P.H., assistant professor of medicine at Einstein and director of the Supporting Emerging Adults with Diabetes (SEAD) program at Montefiore. "That's difficult for everyone, but especially teens and young adults. While some are ready to assume

Young people with type 1 diabetes must be vigilant about controlling their blood-sugar levels, which requires the daily use of insulin. This girl is being taught how to use a penlike syringe for injecting insulin.

responsibility for their care, most need guidance along the difficult journey to adulthood."

Dr. Agarwal created the year-old SEAD program (a part of the Fleischer Institute for Diabetes and Metabolism) to offer that guidance. It's one of the first clinical services specifically designed for people with T1D on the cusp of adulthood (ages 18 to 25).

"Our philosophy at SEAD is to nurture young adults so that they're ready to take over their care when they're transferred to adult services," says Dr. Agarwal. "Imaging studies show that the brain's frontal lobe, which is responsible for executive functioning, doesn't fully develop until the mid-20s. That's when we see our patients taking responsibility. It's like a switch is flipped."

All too often, when left to their own devices, young adults with T1D neglect self-care or are unable to make it a priority. By early adulthood, they may already have started experiencing significant complications. "But if we support these patients and push them toward independence, we can change that trajectory," Dr. Agarwal says.

SEAD is staffed by an endocrinologist (Dr. Agarwal); a nurse practitioner with expertise in type 1 diabetes and advanced technologies such as insulin pumps; a nurse specializing in social work and community care; and, notably, a psychologist—a rare combination in diabetes clinics. The team also offers peer-support groups and a yearly group retreat where participants can discuss T1D-related psychosocial issues and learn about technologies for managing their care, such as continuous glucose monitors and insulin pumps.

"We're not going to improve everyone's glycemic control," Dr. Agarwal admits. "But engaging patients in care is the most important thing we can do. When they're lost to the healthcare system is when things really go wrong."

One of Dr. Agarwal's goals is to create a model of care that can be adopted by providers around the nation, even those with limited resources. "Second, we need to demonstrate that our approach makes sense financially to healthcare providers and payers," she says.

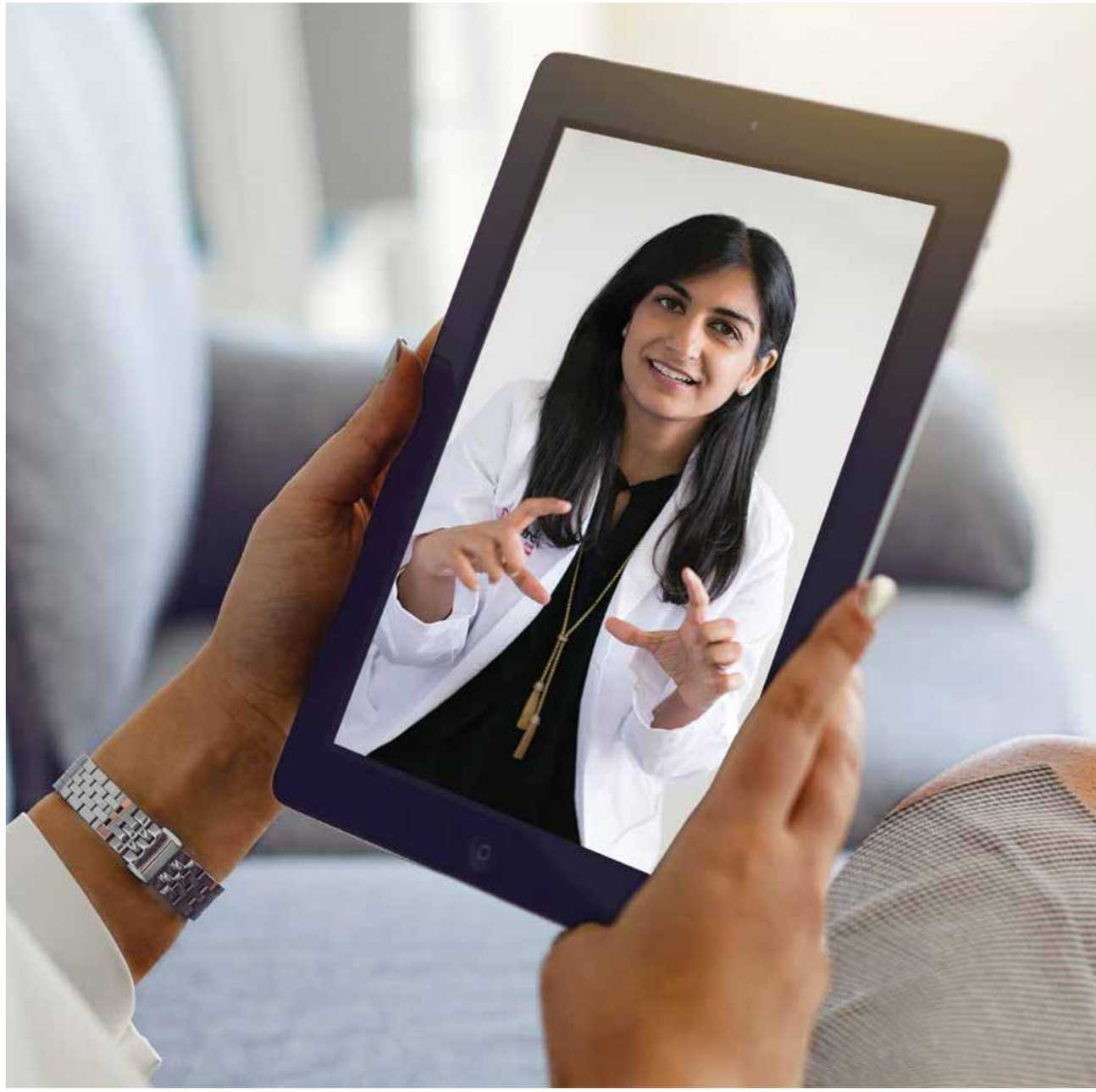
SEAD is a product of a larger project to reduce disparities in T1D care among young racial/ethnic minorities, funded by a five-year, $988,000 award from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). The project aims to identify modifiable factors that can reduce disparities and improve health outcomes, learn more about patient-provider relationships in these communities, and design and test interventions.

Sadly, SEAD came too late for Sam, who later in life became Dr. Agarwal's patient. By his early 30s, he had gone blind from T1D. "It was heartbreaking when he told me he wished he'd had this program when he was younger," Dr. Agarwal says. "Let's hope we can prevent others from developing such devastating complications."

WHAT PATIENTS WANT

For patients with T1D, a key goal is maintaining healthy A1C levels to avoid complications and hospitalizations. But that's not all they want.

"If you ask patients what's important to them, they'll say they want a

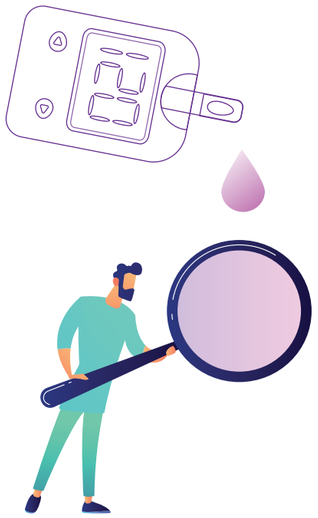


Shivani Agarwal, M.D., conducts a telemedicine visit with a patient via a mobile digital device.

Photo by Jason Torres

"We're not going to improve everyone's glycemic control. But engaging patients in care is the most important thing we can do."

— DR. SHIVANI AGARWAL



good A1C and a good quality of life," says Jeffrey Gonzalez, Ph.D., professor of medicine and of epidemiology & population health and co-director of the New York Regional Center for Diabetes Translation Research. "For them, it's not either/or—and it shouldn't be for caregivers, either. There's a lot of evidence that stress is associated with poor treatment adherence and poor glucose control, so we would do well to emphasize the psychological as well as the physiological aspects of diabetes care."

Dr. Gonzalez is in the vanguard of health professionals bringing much-needed attention to the psychosocial aspects of diabetes, with a particular focus on "diabetes distress"—where patients experience feelings such as stress, guilt, or denial stemming from living with diabetes and the burden of self-management.

To the untrained eye, diabetes distress can look a lot like depression, which is also common among those with diabetes. But the two conditions are different. Depression is characterized by symptoms (such as persistent feelings of worthlessness or guilt, or lack of interest in normal activities) that don't necessarily arise from a specific medical condition. Diabetes distress, by contrast, is an emotional response to having and managing the disease.

"It's important to make this distinction," Dr. Gonzalez says. "An antidepressant may not help a patient who is overwhelmed by diabetes. He or she might be better served by diabetes-specific interventions, such as teaching skills for coping with anxiety or for managing one's illness."

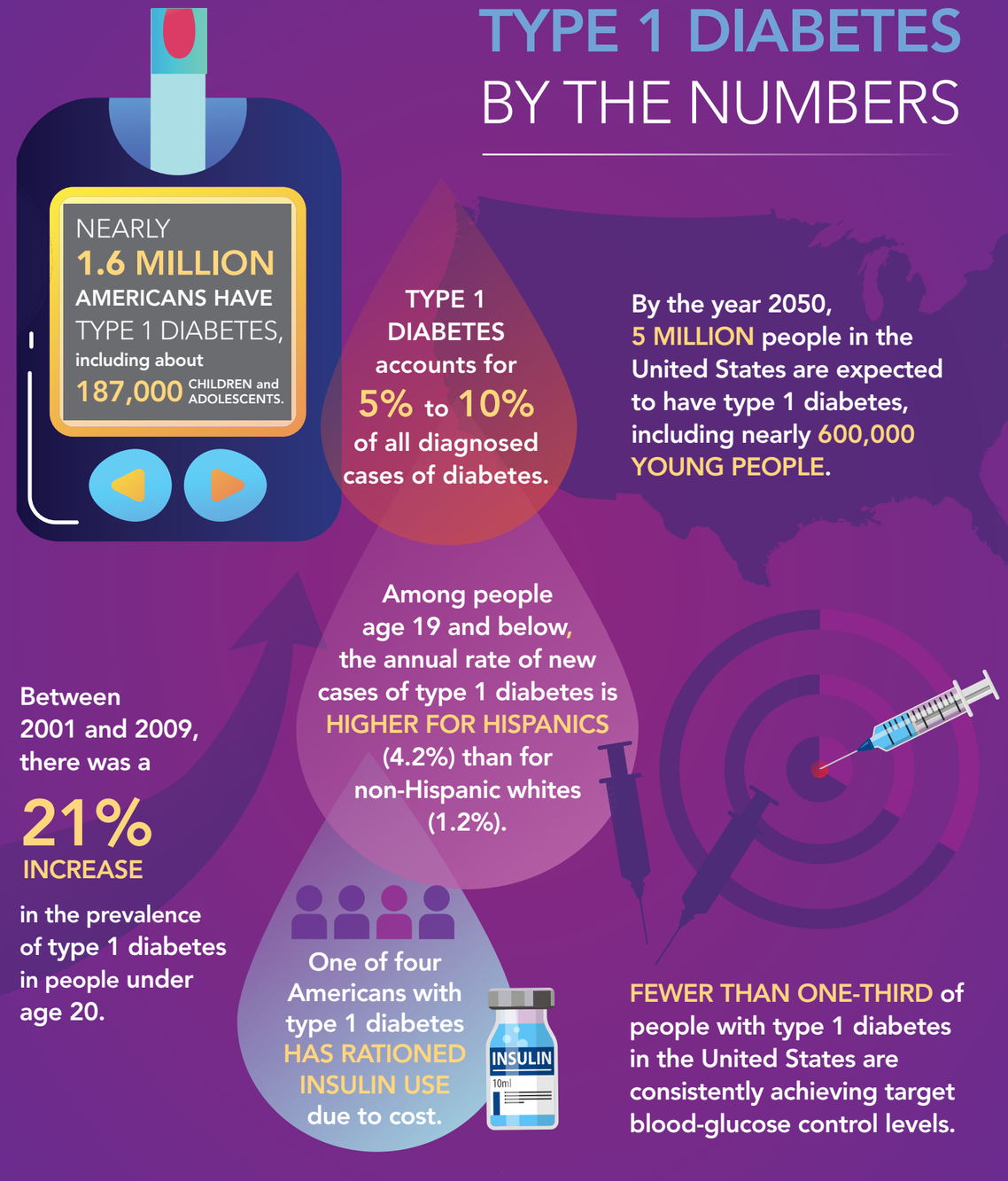
In 2016, the American Diabetes Association began recommending screening for both depression and diabetes distress. "This was an important step forward," says Dr. Gonzalez, who contributed to the new treatment guidelines. "But we still have so much to learn before we can adequately address the problem. For example, we don't really understand the relationship between stress and blood-glucose levels. Does a day of high stress precede a day of poorly controlled blood sugar? Or is it the other way around, or perhaps bidirectional?"

Dr. Gonzalez hopes to answer these and other questions in a study using smartphone apps and continuous glucose monitors (devices that are worn on the body that automatically and continuously measure blood-sugar levels).

"We usually ask patients to fill out paper-and-pencil questionnaires about their moods over a recent week and relate these to a single measure of A1C that may not overlap with that period," he explains. "But memory is often imprecise and unreliable. With our app, we can query patients about their moods several times a day. Then we can correlate that info with data from continuous glucose monitors. This will give a better sense of how stress relates to blood glucose from moment to moment. We'll also determine whether hyperglycemia and hypoglycemia are associated with changes in patients' cognitive function, as has been suspected.

"We need to look beyond A1C," he adds. "The long-term measure of blood sugar is important, but we also need to look at patients' day-to-day experiences with diabetes, and at how those experiences can be improved."

In the meantime, Dr. Gonzalez is also investigating how to make T1D care more patient-friendly and more accessible. Recent surveys show that



most adults with T1D are seen not by endocrinologists but by primary care doctors, who are hard-pressed to give adequate time to patients with complex chronic diseases and may not be familiar with all the nuances of diabetes care.

"Smartphone apps are one approach; telehealth is another," Dr. Gonzalez says. "Adding mental-health professionals to diabetes clinics, as we've done at the Fleischer Institute, would also be helpful. Unfortunately, it's not financially rewarding to deliver mental-health care in this setting, at least in the short term. That's part of the reason why it's so hard to access. Part of my job as a researcher is to demonstrate to payers that this is an investment worth making."

In sum, says Dr. Gonzalez, "clearly, we need to build a workforce that can deal with patients confronting the psychosocial aspects of diabetes care. But it's also clear that we have a long way to go with that mission."

"Clearly, we need to build a workforce that can deal with patients confronting the psychosocial aspects of diabetes care."

— DR. JEFFREY GONZALEZ

AUTOIMMUNITY AND DESTRUCTION

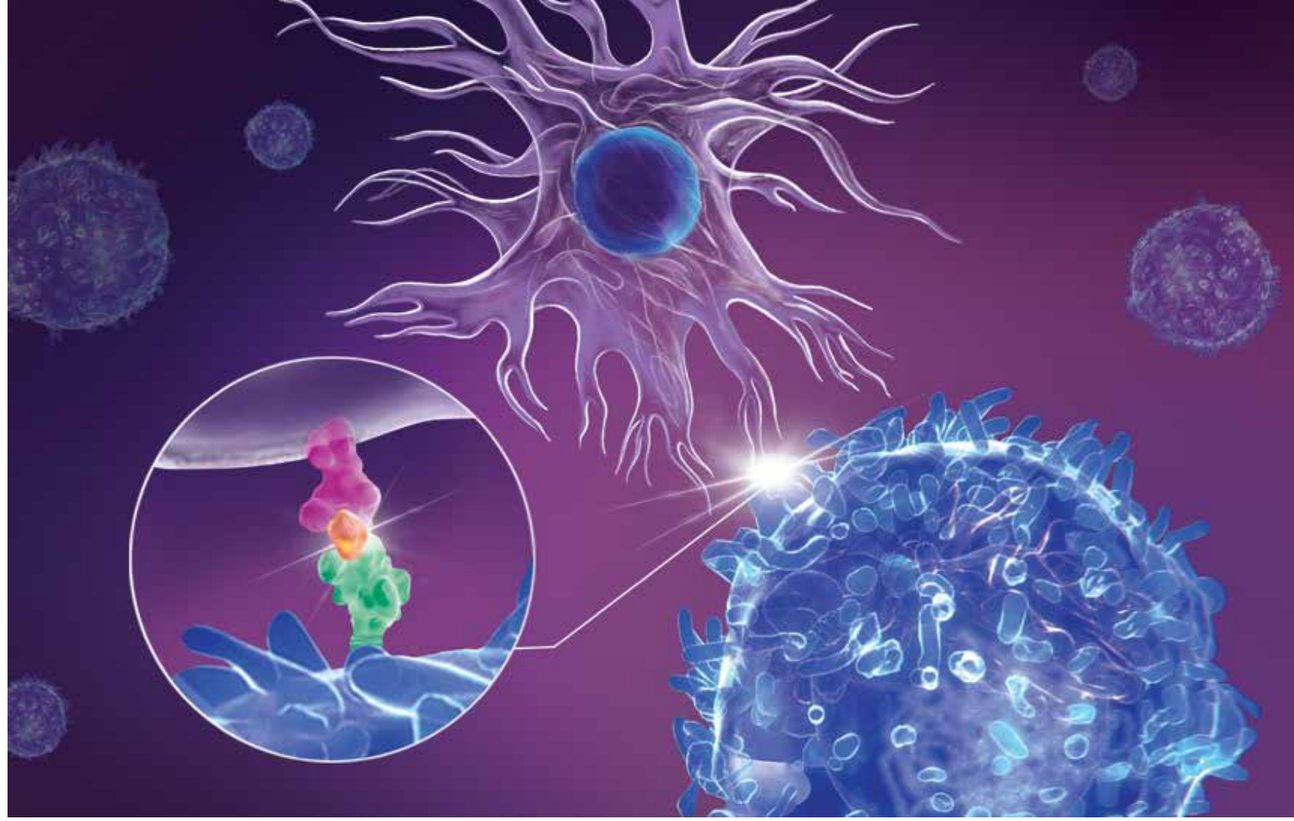
T1D and other autoimmune diseases occur when the immune system—normally a bulwark against viruses and other microbial invaders—instead attacks a person's own tissues. In the case of T1D, the pancreas is the target. Immune cells known as T cells mount the assault, causing inflammation that destroys pancreatic beta cells—the source of the insulin that enables the body's tissues to use glucose as an energy source. Over time, the destruction of insulin-producing beta cells leaves the body unable to control its blood-glucose levels—the hallmark of T1D.

Variations in certain genes called HLA genes are associated with the misdirected T-cell attacks that cause autoimmune diseases. But gene variants aren't sufficient, since fewer than 5% of people with HLA variants develop T1D. Additional factors—most likely environmental exposures of some kind—are believed to trigger T1D in genetically susceptible people.

"There's a lot of debate about what those environmental triggers might be," Dr. Tomer says. "I believe they're viral infections, but they could be chemical exposures or even changes in the gut microbiome. Whatever the trigger, the result is a T-cell attack on the pancreas that stresses or kills insulin-making cells." Dr. Tomer is working to prevent T1D caused by T cells known as CD4+ T cells, or "helper" T cells. He and his colleagues are trying to short-circuit instructions directing CD4+ T cells to target the pancreas.

THE 'MISEDUCATION' OF T CELLS

T cells such as CD4+ T cells aren't born knowing what to hunt for. Just as bloodhounds require a scent to track and find a missing person, T cells rely on



This illustration of an immunological synapse shows an antigen-presenting cell or APC (upper cell) interacting with a CD4+ T cell (lower cell). In the circular close-up of the synapse, an HLA protein (pink) on the APC's surface is displaying a peptide (orange) that is being bound by a T-cell receptor (green). This interaction activates the T cell to attack cells containing that peptide. In type 1 diabetes, the display of peptides belonging to insulin-producing cells in the pancreas "miseducates" T cells to attack and destroy those pancreatic cells.

peptides—bits of protein from invading bacteria, for example—to tell them what to attack. Those immunity-arousing peptides are called antigens.

T cells get their marching orders, in the form of peptide antigens, from another type of immune cell called antigen-presenting cells (APCs). Transferring a peptide from an APC to a T cell resembles spoon-feeding. The APC's "spoon" is present on its surface as a tangle of proteins dictated by HLA genes. This spoon contains grooves, known as "pockets," which accommodate peptides that APCs then "feed" to T cells.

However, some HLA gene variants create APC spoons whose pockets mistakenly bind the body's own peptides. T-cell receptors recognize these "self" peptides—prompting the T cells to attack the body's own cells and tissues and leading to autoimmune diseases.

THE SEARCH FOR POCKET PROTECTORS

Most T1D cases occur when APCs bind insulin peptides, causing T cells to attack insulin-rich beta cells of the pancreas. To halt T1D, Dr. Tomer and his colleagues in the Einstein–Mount Sinai Diabetes Research Center are pursuing a novel strategy: Find peptide drugs to block the binding pockets of APCs susceptible to causing T1D.

Using computer modeling to screen thousands of potential compounds, they found one highly promising pocket-blocking candidate that they are now modifying to boost its effectiveness. It's called a retro-inverso peptide.

"We made a mirror image of the original peptide and then reversed its amino acid sequence," Dr. Tomer explains. "This configuration stabilizes the peptide so it sits securely within the APC's pocket." The experimental peptide has shown encouraging results in inactivating APCs in a T1D mouse model and in cells taken from patients with T1D.

protein is called a synTac, short for "artificial immunological synapse for T-cell activation." The platform can also be tailored to fight other diseases, including cancers and AIDS.

The synTac concept was developed by Dr. Almo, professor and chair of biochemistry, professor of physiology & biophysics, the Wollowick Family Foundation Chair in Multiple Sclerosis and Immunology, and director of the Einstein Macromolecular Therapeutics Developmental Facility. His synTac work with Dr. DiLorenzo is supported by NIDDK.

The Einstein team is producing a variety of synTacs for T1D, designed to target T cells known to interact with the most-common insulin peptides. "We envision that this would be a personalized medicine for T1D," says Dr. DiLorenzo, who is a professor of microbiology & immunology and of medicine and the Diane Belfer, Cypres & Endelson Families Faculty Scholar in Diabetes Research. "We would test the patient's blood for insulin peptides and then choose the appropriate molecules from a whole panel of synTac immunotherapy molecules."

SynTacs could overcome a major drawback of conventional immunotherapies, which indiscriminately affect all T cells—not just the harmful ones—and therefore can cause serious and even fatal side effects. SynTacs, by contrast, should have fewer unintended effects, since they're aimed only at those CD8+ T cells with autoimmune potential.

The search for some way to prevent T1D has gone on for decades. Research by Einstein scientists could potentially achieve that goal. For all the young "Sams" of this world, that would be good news indeed. E

> "We envision that this would be a personalized medicine for T1D."
>
> — DR. TERESA DILORENZO

THE ARTIFICIAL SYNAPSE

CD4+ T cells are not the only T cells implicated in T1D. To prevent T1D, another Einstein team is focusing on CD8+ T cells, or "killer" T cells. The strategy of researchers Steven Almo, Ph.D., and Teresa DiLorenzo, Ph.D., is to intercept misguided CD8+ T cells before they can reach and damage the pancreas. The researchers are testing a novel double-barreled immunotherapy that homes in on specific CD8+ T-cell populations and then inhibits their activity.

The immunotherapy's ammo is a two-armed "fusion protein": one arm docks specifically to CD8+ T cells genetically programmed to attack insulin-producing cells in the pancreas; the second arm puts the CD8+ T cells out of action by stimulating receptors on their surfaces. The double-armed

DIABETES AND COVID-19: A CONFUSING COMBINATION

Early in the COVID-19 pandemic, doctors at Montefiore observed that about 40% of people hospitalized with the disease also had type 1 or type 2 diabetes. It was a striking observation but not a total surprise. People with diabetes are no more susceptible than others to viral infections, but they are more vulnerable to serious complications once infections occur. Factor in the high prevalence of diabetes in the Bronx, and the 40% figure makes sense.

What didn't make sense were other aspects of the coronavirus-diabetes connection. Some patients with diabetes had well-controlled blood-glucose levels pre-COVID-19, but those levels became dangerously high and fluctuated wildly following infection.

Even stranger, COVID-19 may actually *cause* diabetes. Patients with no history of diabetes were showing up on the COVID-19 wards with ketoacidosis, a potentially deadly condition usually associated with type 1 diabetes (T1D). Ketoacidosis (the buildup of acidic substances called ketones) occurs when cells lack sufficient glucose for energy and burn fat instead.

"There are many interesting things about this virus—some more interesting than we'd like," says Jill Crandall, M.D., professor of medicine, the Jacob A. and Jeanne E. Barkey Chair in Medicine, and chief of the division of endocrinology at Einstein and Montefiore.

As yet, clinicians have no definitive guide for caring for COVID-19 patients who have diabetes, so they're learning by doing—and by sharing. Einstein and Montefiore's endocrinologists are now contributing to a nationwide population health–surveillance study of individuals with T1D who contract COVID-19.

"We're focusing this surveillance effort on type 1 diabetes, but we're also interested in the effects of COVID-19 on type 2, the more-common form," adds Dr. Crandall. She notes that patients will also be monitored after they return home, to see if COVID-19 has caused long-term changes to their diabetes.

IMPROVING PATIENT CARE

Meanwhile, Dr. Shivani Agarwal (page 43) is coordinating two pilot projects aimed at improving care for people with diabetes who develop COVID-19.

One project is assessing how well continuous glucose monitors (tiny devices that automatically measure glucose levels) will work on hospitalized patients.

"The monitors are approved for outpatients but not for the inpatient setting, where finger sticks are used," Dr. Agarwal says. "But with nurses so busy and to reduce use of personal protective equipment and exposure to COVID-19, it would be better to automate this process and not use up protective gear just to take a glucose measurement. However, several factors could affect the accuracy of these monitors in the inpatient setting, and so we need to rigorously test this approach."

A second project is evaluating whether subcutaneous insulin injections can replace intravenous insulin drips for managing patients with diabetic ketoacidosis.

"Insulin drips allow for fine-tuning of insulin to control blood sugar but are labor intensive since a lot of monitoring is needed, including hourly finger sticks," Dr. Agarwal says. "In this context, periodic insulin injections may be the better alternative, especially because of COVID-19. Our number one priority is to maintain patient safety and optimize clinical outcomes, but we also need to reduce the burden on our nursing staff. We hope this approach will achieve both goals."

PASSIONATE
PURSUITS

Taking a Walk on the Wild Side

BY GINGER SKINNER

Jeremy D'Arbeau captured this image of a jellyfish at the National Aquarium Denmark. The photo, called "Ocean's Life," is featured in the 2020 issue of Einstein's *Ad Libitum* magazine.

Before the COVID-19 pandemic shut down much of New York City last spring, one of photographer Jeremy D'Arbeau's favorite destinations was the Bronx Zoo. He would sit quietly on the sidelines, his gaze fixed on his animal subjects, as visitors wielding camera phones darted around him from one exhibit to the next.

"With wildlife you have to be very patient," he says. To capture a mother gorilla cradling her baby (page 53), he waited nearly two hours for the right moment. "Snapping that picture wasn't just about the photo," says the 39-year-old Mr. D'Arbeau. "For me it was about stepping into a mother's home and experiencing how she feeds and cares for her young."

A systems engineer in the department of information technology at Einstein, Mr. D'Arbeau took up wildlife photography six years ago as a hobby. "I love capturing subjects that are unaware of the photographer," he says. "I like to picture myself in the animal's habitat, whether it's eating, catching its prey, or caring for its young." While taking photos at the zoo, he shuts off his flash so he won't startle the animals, and uses natural light instead.

His photographs of apes, aquatic life, and birds are featured in the 2019 and 2020 issues of *Ad Libitum*, Einstein's annual art and literary magazine, and he received a Mark of Excellence prize for wildlife photography in an online photo competition called "I Shot It!"

"Snapping that picture wasn't just about the photo. For me it was about stepping into a mother's home and experiencing how she feeds and cares for her young."

— JEREMY D'ARBEAU

In addition to photographing animals, Mr. D'Arbeau focuses on sports, long-distance cycling in particular. Since 2015 he has taken photos of the annual Gran Fondo New York race, often riding on the back of a motorcycle while balancing two cameras. His pictures of bicyclists crossing the finish line are featured in *Gran Fondo* magazine. "Capturing those intense moments, especially the winning moment—there's nothing like it," he says.

HIS GRANDFATHER'S GIFT

Mr. D'Arbeau's first camera was a toy model his mother gave him when he was 7. Camera in hand, he would shadow his grandfather, a New York City transit worker who toted Pentax and Leica cameras to work, seizing any opportunity to photograph passersby. "My grandfather was the first person I ever saw using a camera," Mr. D'Arbeau says. "Today you'd call it street photography; I call it photojournalism."

When Mr. D'Arbeau turned 18, his grandfather became very ill and his grandmother started giving away his belongings. Mr. D'Arbeau claimed his grandfather's Pentax cameras and right away began inspecting the decades-old film rolls, exploring New York City through his grandfather's eyes. "The way he would see things and capture people walking by, that's truly what motivated me to take up photography," he says. "After that I began walking around and creating various projects for myself." His other influences include trailblazing 20th-century photographers Gordon Parks and Paul Strand and filmmaker Stanley Kubrick.

FLASHING FORWARD

The COVID-19 pandemic forced Mr. D'Arbeau to shelter at home in White Plains, New York. "In the way that writers experience writer's block, I found myself experiencing photographer's block," he says. But the chance to photograph a nearly empty Grand Central Terminal for his cousin's college graduation reinvigorated him. "No one else was around, and it was midday on a Saturday in late spring," he says. "No crowds. No commuters. No disruptions. It was something I normally would never have been able to do."

Mr. D'Arbeau looks forward to resuming a project he started with a relative in late 2019: directing and videotaping a cooking show. He equates mapping out the show's next phase with preparing for his next photo session at the Bronx Zoo. "Both require a certain amount of patience," he says, "but the results are worth waiting for." E

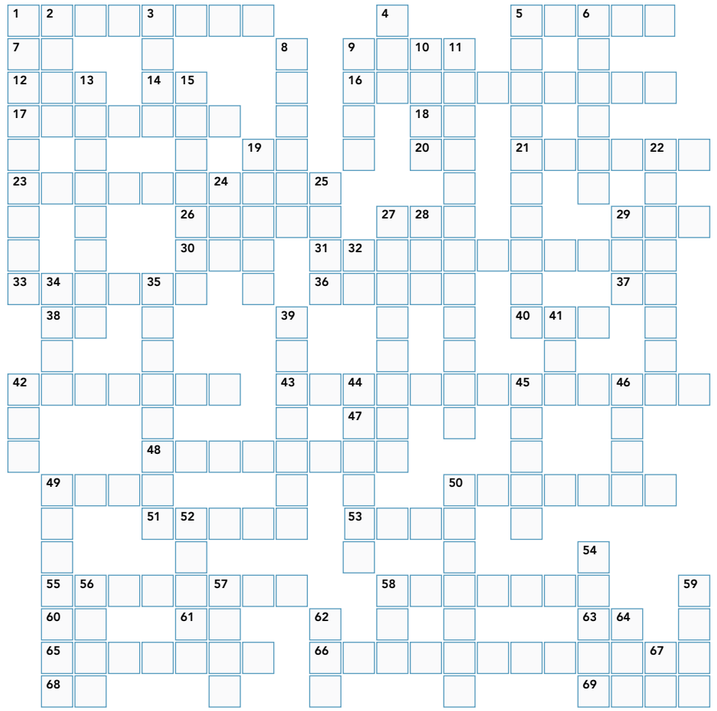
Two photos Mr. D'Arbeau captured at the Bronx Zoo: At top, a mother gorilla and her baby; above, a Nicobar pigeon, which may be the closest living relative of the extinct dodo bird.

VIEW MORE
Find additional photos by Mr. D'Arbeau:
magazine.einstein.yu.edu/photos20

ALBERT'S PUZZLER

BY DEIRDRE BRANLEY

Of Plagues and Pandemics



Across

1 Yellow discoloration of the skin
5 Organ in the skull
7 Not off
9 Energetic enthusiasm
12 Grab
14 I think, therefore I _____
16 Procedure developed to help diphtheria patients with blocked airways
17 Arranged in a straight line
18 Rare blood type
19 Atomic symbol for gold
20 To _____ or not to be
21 A type of inhibitor used to treat cancer, and possibly COVID-19
23 Pandemic that came after WWI
26 Liquid unit of measure
27 As needed: Ad _____
29 Viral cause of the AIDS pandemic
30 Suffix to denote inhabitants of a place
31 A practice to prevent infection used in China beginning in the 11th century
33 U.S. state where the Spanish flu originated
36 Path between eardrum and outer ear
37 Symbol for germanium
38 Type of scan used to detect severe COVID-19 lung infection
40 Thigh bone's connected to the _____ bone
42 Disease famously spread asymptomatically by Mary Mallon
43 Epidemic spread by fleas in 14th century
47 Not out
48 Artificial respirator with a steely name
49 12 p.m.
50 Animal whose eggs were used to grow the virus for the first flu vaccine
51 Epidemic in West Africa in 2014–16
53 An area of red, often itchy, skin
55 Diseases brought by Europeans to the Americas, devastating indigenous populations
58 Parasitic disease once endemic in every American state except Alaska
60 Latin abbreviation for "in other words"
61 _____ and fro
63 Short for infectious diseases
65 Where the Anti-Vaccination League of America held its first meeting in 1882
66 Person credited for smallpox vaccine
68 Our dean's initials
69 Domesticate

Down

1 American virologist who developed the first successful polio vaccine
2 Slang for uptight, or relating to the anus
3 Leader of the medical school
4 Epinephrine injector: Epi_____
5 Colloquialism for bubonic plague
6 Negatively charged ions
8 A sealed glass capsule containing a liquid for injecting
9 Mosquito-borne virus declared an emergency in 2016
10 Attempt, or type of surgical incision
11 Has killed more people than any other infectious disease in history
13 Vaccine that protects against 2 viral types
15 Disease whose 2019 outbreak included 1,282 U.S. cases, 73% linked to New York
19 Not before
22 Name for H1N1 in 2009–10
24 Belonging to him
25 Acid that is excreted
27 Place where the 1968 pandemic H3N2 was first reported
28 Short for oculocutaneous albinism
29 Animal used for vaccine development
32 Symbol for sodium
34 A description for continuous, dull pain
35 Second-century plague brought to the Roman Empire by returning soldiers
39 Disease first described by German physician Friedrich Hoffmann
41 Not well
42 Foot digit
44 Made up of two elements or parts
45 Although depictions of this disease date to prehistoric times, it is nearly eradicated
46 Nucleotides within a chromosome
49 A profession that cares for the sick
50 Beginning in 1817, a series of seven pandemics of this disease swept the world
52 Sled dog whose Central Park statue honors his help with Nome diphtheria outbreak
54 Lose consciousness
56 Encounter, or a type of sports competition
57 A small opening in the skin or nucleus
58 Animal mouth
59 Restore someone to health
62 Busy time of sleep for your eyes
64 Carrier of genetic information
67 Department that runs the ER

See how well you did at: magazine.einstein.yu.edu/puzzler20

MOTIVATIONS

The Front Line of Philanthropy at Einstein and Montefiore

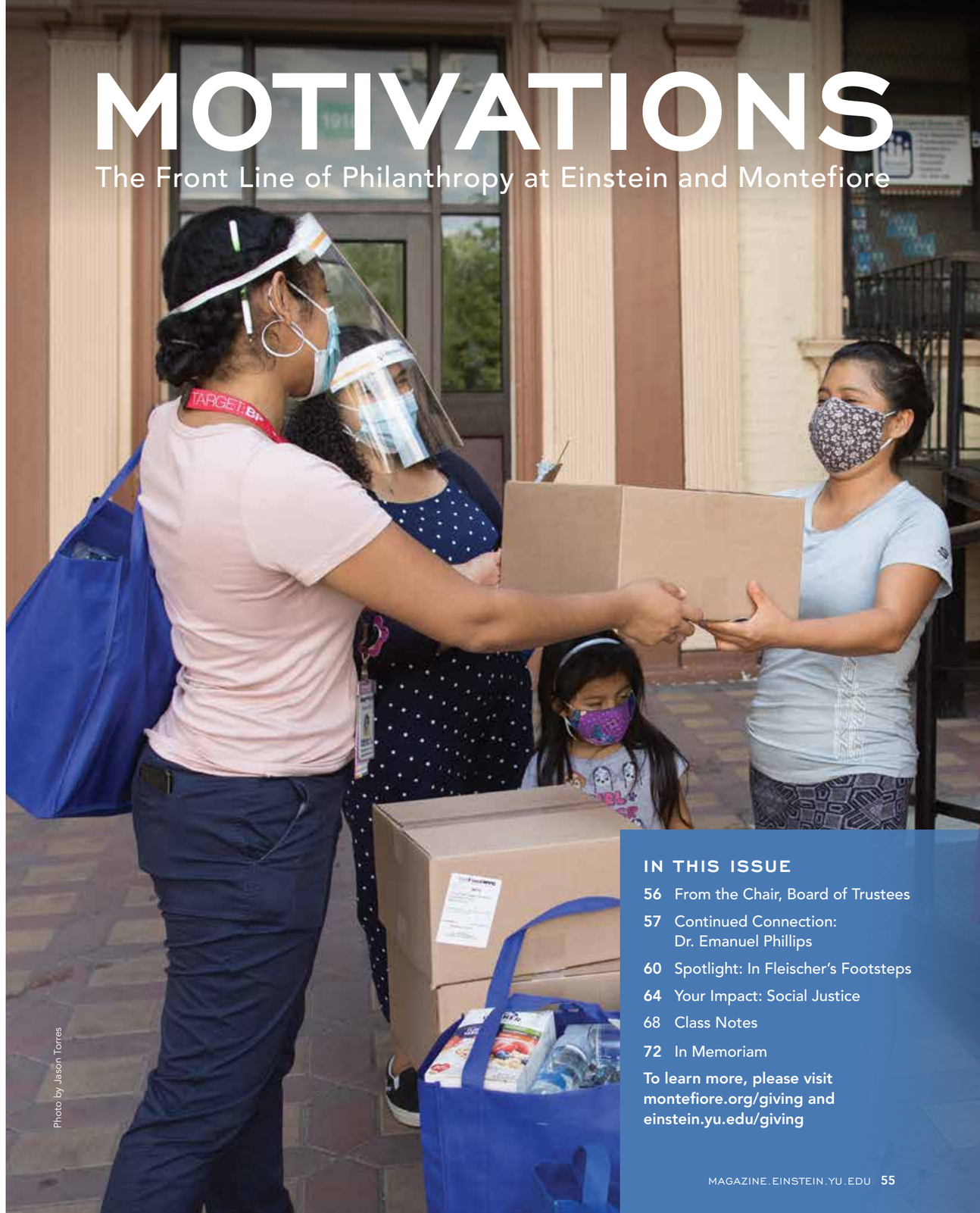


Photo by Jason Torres

IN THIS ISSUE

To learn more, please visit montefiore.org/giving and einstein.yu.edu/giving

A Message From the Chair of the Einstein Board of Trustees

ROGER W. EINIGER

Doctor of Humane Letters, Albert Einstein College of Medicine

Roger W. Einiger

When my parents, Glory and Jack, made their first gift to a young, groundbreaking medical school in the 1950s, they sought to make the world a better place—for their children, for aspiring doctors and researchers from all cultures and backgrounds, and for the Bronx and beyond. During their long history as philanthropists and founding leaders of Einstein, they helped build the medical school into the research powerhouse, top-ranking academic destination, and force for social good that it is today. I am honored to continue their legacy.

Similar enduring commitments from countless supporters have propelled our mission from my parents' time to now—and we're seeing those investments pay off at never-before-seen speed. Discoveries that scientists began to unearth years ago are informing current COVID-19 treatments. The previous generation's physicians are mentoring the newest interns. And we're saving lives through exceptional science.

Einstein students, alumni, researchers, and donors share the passion and foresight of those who came before us to work together toward a healthier, stronger tomorrow. The inspiring individuals showcased in this issue of *Motivations* embody that purposeful spirit.

One striking example is Emanuel Phillips, M.D. '59. Through a $2 million endowed scholarship, Dr. Phillips is paying forward the generosity of donors who made an investment in our medical training program six decades ago (page 57). In a similar spirit, Montefiore Health System trustee Justice Felice Shea has dedicated her life to shaping social-justice initiatives for all (page 64). And the lifelong work of Norman Fleischer, M.D., lives on through transformational contributions to the Fleischer Institute for Diabetes and Metabolism (page 60).

What we accomplish today is in large part a product of caring partners throughout Einstein's history. Our connections are strong and sustained—and will only grow with each new stride we take.

Together, our Montefiore and Einstein community drives action that will affect health for generations to come. My parents looked toward the future with hope; I do the same, knowing we can and will shape it for the better. Thank you for standing with me and with Einstein.

Sincerely,

Roger W. Einiger

DR. EMANUEL PHILLIPS CLASS OF '59

Member of Einstein's first graduating class pays a kindness forward with $2 million endowed scholarship

BY TERESA CARR

Iris Phillips and Emanuel Phillips, M.D. '59

Emanuel Phillips, M.D. '59, is a member of Albert Einstein College of Medicine's first graduating class. He went on to serve in the U.S. Army as a medical officer and then returned to Einstein to teach internal medicine and care for families in the Bronx and surrounding communities for more than three decades. But his eminently successful medical career nearly didn't happen.

Dr. Phillips's family fell on hard times while he was in medical school, and only with financial support from Einstein was he able to graduate. He has been returning the favor ever since. In his most recent act of generosity, Dr. Phillips and his wife, Iris, announced a $2 million endowed scholarship enabling talented students to pursue careers in science and medicine. His gift will support aspiring physicians and researchers for generations to come.

In reflecting on his connection to Einstein, Dr. Phillips says a lot has changed since he first set foot on campus, but one thing in particular remains constant: the idea that everyone deserves quality healthcare delivered by well-trained, compassionate physicians. Here, he answers a few questions about his history—and future—at Einstein.

What was it like to walk into a brand-new medical school?

Back then, the school consisted of one building—Forchheimer—and it wasn't even totally finished. Some of the rooms still contained scaffolding, and we saw workmen all around. Some of the creaks didn't come out until after the first few weeks, but that didn't matter. We had a table for anatomy dissections and nice lecture halls.

And it was an exciting time! Even though it was a new school, it was strongly connected to the past. The faculty brought in wonderful lecturers from far and wide, some quite famous. I remember being impressed when the pediatrician Béla Schick, founder of the Schick test, which helped eradicate diphtheria in this country, came to talk. I felt like I was following in the tradition of a long line of extraordinary physicians.

Aside from having grown, how has Einstein changed?

Now, when I walk in, I notice right away that it's much more heterogeneous. Our class was all white and Jewish, and there were only three women. Today it's much more diverse and welcoming, which is a good thing. When I started out, you couldn't get into some medical schools because you were Jewish. Those barriers based on race, ethnicity, income, or other factors just shouldn't exist.

How did you meet your wife, Iris?

For many years, I was all wrapped up in my work and my parents, and I didn't have much time to socialize. One of my medical colleagues wanted to introduce me to Iris, but I had just been diagnosed with bladder cancer and wasn't quite ready. After six months, my treatment had gone well, and I decided "Now's the time." I met this lovely woman and thought "This is the one for me." We went on our first date in December 1984 and were married by the following May. So that's been it for more than 35 wonderful years.

Members of Einstein's first graduating class gather for a group photo on June 10, 1959, outside the Van Etten Building. Dr. Emauel Phillips is pictured in the top row, the 10th person from the left.

Did undergoing treatment for cancer change how you interact with your own patients?

It sure did. There's nothing like being in the bed yourself to change your perspective. I remember feeling crazy with worry, waiting for 10 days for the pathology report to come back after I had a biopsy. After that, I tried to be as responsive to my patients as possible. I also became a better listener.

What do you value most from practicing medicine?

Looking back, what gave me warm feelings were the connections I made with my patients. I often took care of multiple generations of the same family. Some of the kids are now adults and still call to check on me. I get holiday cards. When I practiced, you were more socially connected to your patients. If someone called because they were hurt or seriously ill, I'd say, "Meet me at the emergency room and we'll take care of it." I treated people in the hospital and made house calls when I could. There was a personal touch that I think is quite lacking in medicine today.

What led you and Iris to establish an endowed scholarship?

In my fourth year of medical school—it's still difficult for me to talk about—my father became very ill and our finances were strained. I didn't know how I was going to get through it. I went to my adviser crying because I felt the shame of being a 25-year-old man in need of financial support. An assistant dean got me the funds I needed to complete my education.

I've never forgotten that. Einstein gave me my profession, my livelihood, my purpose, really—and I'm grateful. My wife and I agreed that lack of funds shouldn't be a barrier to a good medical education. This is our way of helping to equalize things, so that someone who's talented and has a desire to practice medicine can, and then pay it back by serving the community.

By creating an endowed scholarship, we hope that the funds will be self-perpetuating. My dream is that someday there'd be enough for every student to go to school tuition-free. Then students wouldn't have financial pressure or debt; they could practice humane rather than businesslike medicine. There's this old Yiddish expression I love: "The shrouds have no pockets," which means "You can't take it with you." My wife and I have no heirs. Our donation will help train the next generation of physicians—that's my progeny, my DNA.

What is your advice to students?

One of the most important things I imparted was how to handle difficult aspects of being a physician, like telling a patient about a cancer diagnosis—how to be optimistic, but also help carry people through a difficult time. I want students to understand that it's not all peaches and cream in life. Compassion is what sees you through. E

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— **Michael F. Price, Trustee**
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In Fleischer's FOOTSTEPS

New diabetes institute builds on a legacy of research and interdisciplinary care

BY GARY GOLDENBERG

Amputations, vision loss, kidney failure, heart disease: Diabetes and its complications can ravage the human body. "But those tragedies are not inevitable," says David K. Bloomgarden, M.D., F.A.C.E., an endocrinologist in private practice for more than 40 years. "They should not happen with dedicated diabetes management."

Dr. Bloomgarden's mission in life has been to spread that preventive creed, first in his own practice and now in his philanthropic endeavors at Einstein's Fleischer Institute for Diabetes and Metabolism.

Originally intent on a career in rheumatology, Dr. Bloomgarden switched specialties late in his residency at Einstein, following a rotation under Norman Fleischer, M.D., the founding director of Einstein's National Institutes of Health–funded Diabetes Research and Training Center. "I was so inspired by Norman's ability, knowledge, and kindness that I asked if I could do a fellowship with him," he says. "Happily, he took me on, and the rest is history."

In 1982, Dr. Bloomgarden opened his own endocrinology practice in nearby Westchester County, New York, where he put his mentor's lessons into effect. "Norman taught us that we could make a profound difference in the lives of our patients," Dr. Bloomgarden says. "Finger-stick glucose monitoring had been introduced a few years earlier. It helped give patients more control over their disease, which we could reinforce with education and counseling. Continuous glucose monitoring today makes that effort even more achievable."

Over the decades, Dr. Bloomgarden honed his clinical skills, learning how to keep diabetes complications to a minimum. "Helping patients with diabetes live long and healthy lives is difficult," he says, "but it's doable with attentive care, collaboration, and attention to detail."

BUILDING A CENTRAL HUB

As Dr. Bloomgarden's practice grew, so did his frustration that many other diabetes patients were receiving less-than-optimal care. Four years ago, he talked with Dr. Fleischer about

CLOCKWISE FROM TOP: Norman Fleischer, M.D., Einstein professor emeritus of medicine and former chief of the division of endocrinology at Montefiore, who died in 2018; the waiting room of the new Fleischer Institute for Diabetes and Metabolism; David K. Bloomgarden, M.D., with his wife, Jane Bloomgarden, Ph.D., right, and Eva Fleischer, LCSW, who was at the institute's opening to honor her late husband; and healthcare staff at work at the new center.

Endocrinologist Noah Bloomgarden, M.D., tends to a patient at the new Fleischer Institute.

launching an institute dedicated to diabetology, both locally and nationally. "Montefiore physicians and Einstein scientists needed a place to come together to capitalize on their expertise, build a central hub for innovative care and research, and fill the void of a comprehensive center in the Bronx," Dr. Bloomgarden says. "I was determined to make it happen."

Sadly, Dr. Fleischer died shortly after that meeting, but Dr. Bloomgarden persevered. He worked with leaders at the hospital and medical school, marshaling support to create the Fleischer Institute for Diabetes and Metabolism, which opened in 2018. It combines research, clinical care, and education in one location, allowing Einstein discoveries to help Montefiore patients.

INSPIRED PHILANTHROPY

Dr. Bloomgarden is quick to share credit for this accomplishment with his late father-in-law, Albert Willner, M.D., an orthopedist and philanthropist. "His philanthropy inspired both my wife [Jane, a clinical psychologist in private practice and director of the child/adolescent/parent psychotherapy training program at the Westchester Center for the Study of Psychoanalysis and Psychotherapy and adjunct faculty member at the Ferkauf Graduate School of Psychology] and me to do charitable work. He generously set aside funds to make that possible," he says.

The example set by his father—Kermit Bloomgarden, a noted Broadway producer—also inspired him. "He was active during the Hollywood blacklists, when so many people in entertainment lost their livelihoods," Dr. Bloomgarden says. "He taught me to be more socially conscious, and I've put that energy into my philanthropic work for Montefiore and Einstein."

Dr. Bloomgarden in turn inspired one of his three sons, Noah, to become an endocrinologist. Dr. Noah Bloomgarden also had the good fortune to study under Dr. Fleischer and continues both Dr. Fleischer's and his father's devotion to the field as a member of the Einstein and Montefiore faculty.

"One way we're honoring his legacy is to create a place where patients can get truly comprehensive care."

— DR. JILL CRANDALL

"Norman was an inspirational figure, the grandfather of everything we do here in endocrinology. There's no better name to be attached to this institute," says its inaugural director, Jill Crandall, M.D., chief of the division of endocrinology, professor of medicine, and the Jacob A. and Jeanne E. Barkey Chair in Medicine at Einstein.

"One way we're honoring his legacy is to create a place where patients can get truly comprehensive care," Dr. Crandall adds. "For those with type 2 diabetes, that might mean treating both diabetes and obesity, since it's very common for patients with diabetes to be overweight. Obesity worsens diabetes, and unless you treat the former you'll never be able to manage the latter." To that end, the Fleischer Institute is planning to open a comprehensive weight-loss program along with an obesity research center.

Close collaborations—between researchers in diabetes and obesity, between the lab and the clinic, and between generous partners—have been and will continue to be a priority. "We need to make sure that our research findings inform our clinical care, and vice versa," says Jeffrey Pessin, Ph.D. He directs the Einstein–Mount Sinai Diabetes Research Center (a component of the Fleischer Institute) and oversees the work of more than 90 diabetes investigators. He is also a professor of medicine and of molecular pharmacology and the Judy R. and Alfred A. Rosenberg Professorial Chair in Diabetes Research at Einstein.

CONTINUING TO GROW

Thanks to Dr. Bloomgarden and other donors, the Fleischer Institute is increasingly able to meet the needs of people with diabetes. In 2019, the institute's staff of more than 30 physicians, psychologists, nurses, technicians, dietitians, and administrators had an average of 730 patient visits per month—double the number in 2018.

"Unfortunately, Norman didn't live to see the Fleischer Institute," Dr. Bloomgarden says. "But I think he would be proud of what it has become. And I hope all who share this commitment will join me in helping expand this young institute's growth." E

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COUNSELING FOR 'DIABETES DISTRESS'

People seen at the Fleischer Institute will have access to psychological counseling—an important need of many patients who often experience "diabetes distress," the emotional burden caused by coping with this chronic disease (page 46).

"There's more awareness than there used to be of the mental health problems associated with diabetes, but psychological support is rare," says Jeffrey Gonzalez, Ph.D., professor of medicine and of epidemiology & population health at Einstein. "With the Fleischer Institute's support, we can make sure that our patients get this type of care, and we can demonstrate to providers and payers that it can improve outcomes and reduce overall costs."

The institute's psychological counseling services includes the Supporting Emerging Adults with Diabetes (SEAD) program, unique in that it guides young adults with type 1 diabetes during the difficult transition from pediatric to adult care (page 43). SEAD's one-on-one counseling helps patients with diabetes meet their target blood-glucose levels and avoid serious complications and hospitalizations, according to SEAD director Shivani Agarwal, M.D., assistant professor of medicine at Einstein and director of the Young Adult Diabetes Clinic at Montefiore.

"A major reason I chose to come to Montefiore and Einstein was that its leaders—and Dr. Yaron Tomer specifically comes to mind—were willing to put the resources into this program," Dr. Agarwal says. "They understand the power of multidisciplinary diabetes care." (Learn more about Yaron Tomer, M.D., professor and chair of medicine and the Anita and Jack Saltz Chair in Diabetes Research at Einstein and Montefiore, on pages 30 and 43.)

PUTTING Social Justice INTO PRACTICE

BY TERESA CARR

Retired State Supreme Court Justice Felice K. Shea continues a lifetime of public service by working to improve health and equity for New Yorkers.

Once every month, retired Justice Felice K. Shea walks into a packed room of 20 lawyers and 100-plus people who are looking for legal advice. It's all part of Monday Night Law, a community-service program providing free counsel to people who can't afford it and sponsored by the New York City Bar Association.

The COVID-19 pandemic halted the program, but Justice Shea, a member of the board of trustees for Montefiore Health System for the past two decades, plans to continue giving free consultations once it resumes. "There's a huge shortage of lawyers for people who can't afford to pay," she says. Maybe these people have been discriminated against at work. Maybe they've been forced out of their housing. Or maybe they are getting the runaround on a federal benefit check. "We explain how the system works and connect them to community resources," she says.

Justice Shea served on the New York State Supreme Court for more than 20 years. Running through her professional and personal life is her belief that people at every level of society deserve equal rights, opportunity, and treatment."To me, a law degree was a springboard for making a difference in this world," Justice Shea says. "Law seemed like a good vehicle for helping people who were most in need."

Part of that social-justice mission involves providing good healthcare, which is central to a community's well-being, she says. "Healthcare *is* a human right," she says. "And good healthcare, respectfully given and patient-centered, is what Montefiore is all about. To me, that is social justice."

To that end, she has carried on her family's tradition of serving Montefiore. "My parents were both active Montefiore trustees," she says. "My mother was also a member of the women's auxiliary and worked in the library—I remember her wheeling around carts of books to patients."

DOING JUSTICE

In 1947, married and with a young child, Justice Shea made a bold and rare move for that time—she enrolled in Columbia Law School as one of 10 women in a class with 235 men. She graduated three years later into a field with few opportunities for women. "Women weren't even interviewed for jobs at law firms," she says. "So I always knew I was going into public service."

After having two more children and working part-time for a few years, she became an attorney for the Harlem branch of the Legal Aid Society, spending most of her days in court. "The work of representing indigent clients was very satisfying," she says. "And I got an enormous amount of litigation experience, which was a good background for being on the bench." Justice Shea served on the Civil and Family Courts before she was elected to the New York State Supreme Court and served until retiring at the end of 1999.

> "It fits into my idea of doing good,of helping to improve people's quality of life."
>
> — JUSTICE FELICE K. SHEA

A FORCE FOR GOOD

In retirement, Justice Shea continues working to improve the courts. She has represented children in Family Court. She has served as a referee for the New York State Commission on Judicial Conduct (where she was formerly a commissioner), which hears complaints of ethical misconduct by judges. She also has served on the Mayor's Advisory

Photo reprinted by permission of YANA PASKOVA/The New York Times/Redux

Committee on the Judiciary, the Dean's Council of Columbia Law School, and the board of the Correctional Association of New York, in addition to her work on the Montefiore board of trustees.

She supports Montefiore through unrestricted giving because she values its contributions to the Bronx, home to some of the poorest and most-vulnerable populations in the nation. "It fits into my idea of doing good, of helping to improve people's quality of life," she says. "This institution provides community outreach in addition to first-rate healthcare and is truly a force for good."

Her generosity and the contributions of others help fund Einstein and Montefiore initiatives to advance social justice. "We can't do the work without the support of people like Justice Shea," says Alan Shapiro, M.D., clinical assistant professor of pediatrics at Einstein and senior medical director of community pediatrics programs at Children's Hospital at Montefiore.

Dr. Shapiro is also the medical director of the immigrant assistance group Terra Firma, a collaboration between Montefiore, Children's Health Fund, and Catholic Charities (see story at right). "I've witnessed firsthand how Terra Firma can lift people up and improve the well-being of an entire community," he says.

Justice Shea's advice to younger people who want to make a difference is to start small—to look for ways to help in their own communities. "That's always where the path toward progress begins," she says.

ON A MISSION TO

Improve Health

3 Programs That Help the Most-Vulnerable

Einstein and Montefiore were founded on the notion that social justice and health are inextricably linked. Here are three local programs made possible by unrestricted support to Einstein and Montefiore from individuals, corporations, and foundations.

1 SUPPORT FOR IMMIGRANT CHILDREN

Terra Firma provides healthcare, food, and other necessities to immigrant children and their families. "If we want to improve the well-being of an individual or a community, we can't ignore inequalities," says Alan Shapiro, M.D., its medical director. "By providing vulnerable populations with equal access to healthcare and other resources, we can help them live longer, healthier lives."

For many patients in the Bronx, the COVID-19 pandemic has been financially devastating, says Terra Firma's program administrator, Mia Stange, M.P.H. "Our health center has set up an emergency pantry with food, household items, and emergency cleaning supplies, as well as bilingual education materials about COVID-19," she says. Many of Terra Firma's youth and families are ineligible for federal relief, unemployment, and other safety-net benefits, says program specialist Felin Martinez. An in-house pantry, she says, "allows them access to resources they desperately need."

Leroy, who arrived from Honduras four years ago, says Terra Firma "is like part of my family." (He requested that his last name not be used.) Separated from his mother at age 8, Leroy grew up selling fish and fending off gangs instead of going to school. At 17, he fled to the United States, where he was reunited with his mother while awaiting

Terra Firma's food pantry is a lifeline for immigrant families in the Bronx. From left, Fadhylla Saballos, Felin Martinez, Maria Umpierre-Lopez, and Maria Miranda add masks to distribute alongside emergency food packages.

Terra Firma co-founder Cristina Muñiz de la Peña, Ph.D., works with a young man.

his immigration hearing. "Terra Firma helped me learn English, to find a lawyer, and to get a job because I need to work to help my mother," he says.

He also received counseling to help deal with the trauma of his childhood. "I kept having bad dreams. My doctor helped me put the bad stuff behind me," he says. With experience working as a carpenter and roofer, he says that he'd like to own his own business. "I want to help other people and give them jobs," he says. "That's my dream."

2 ADDICTION RESEARCH

By 2005, Chinazo Cunningham, M.D., M.S., associate division chief of general internal medicine at Einstein and Montefiore, had worked for nearly a decade bringing healthcare to the marginalized—people who were HIV positive, addicted to opioids, and homeless. The U.S. Food and Drug Administration had just approved buprenorphine, a breakthrough treatment for opioid addiction that could be used in any setting. Dr. Cunningham had an epiphany: "I realized that buprenorphine was going to change people's lives because it could be used in primary care to treat their addiction."

That idea helped create one of the largest academically affiliated addiction-treatment programs in the United States, with more than 50 doctors treating patients in seven primary-care clinics in the Bronx. "We've been at the forefront of integrating opioid addiction into primary care," Dr. Cunningham says.

One way to accomplish that, she says, is to provide funds to teach workers across the healthcare

One goal of Chinazo Cunningham, M.D., is to create a center for addiction.

system—emergency-care physicians, obstetricians, pediatricians, and others—how to identify and treat addiction. One of her goals is to help create a center for addiction that will care for patients, conduct research, and educate healthcare workers as well as the community. "This is how we synergize our efforts across all of Einstein and Montefiore," she says. "We'll be able to take our work to the next level, combating addiction in our community and across the country."

3 TRAINING IN PRIMARY CARE AND SOCIAL INTERNAL MEDICINE

Residents who work with underserved populations must get to know their

Residents learn how to partner with community organizations in the Bronx.

communities, says program co-director Shwetha Iyer, M.D., associate professor of internal medicine and of family and social medicine at Einstein. "Regardless of what population you treat, if you don't know who you are serving and the specific issues they face, you can't do a good job taking care of patients," she says.

"One of the first things we do is spend a month introducing residents to the Bronx—the people living here and the structural barriers in place," Dr. Iyer says. In their second year, they learn about "liberation medicine" and how to partner with community organizations. By year three, they are shadowing physicians in homeless shelters, prisons, and methadone-maintenance centers.

"Young physicians come to realize that the community has tremendous resources that they can draw on to help improve their health," she says. The primary-care and social-medicine residency has earned a national reputation for training physicians who become leaders in public health, research, education, and clinical care. E

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CLASS NOTES

1950s

Donald Kline, M.D. '59, has released his 11th novel, *The Fifth Season*. This and his other novels are available at Amazon and Barnes & Noble online (under the name Don Kline). He is working on number 12; be sure to look for summaries on Facebook.

1960s

Jonathan Ostrow, M.D. '62, retired from active practice several years ago and now volunteers as a physician at two clinics—Casa Latina, a University of Washington medical student–run clinic in Seattle, and Clinica Amistad, a free clinic in Tucson. He stays busy playing bridge and Scrabble and enjoys theater, hiking, music, and the outdoors. Unfortunately, he rarely sees other Einstein graduates anymore, but does keep in touch with **Leon Redler, M.D. '62**.

Laurence Platt, M.D. '68, received a Diversity and Inclusion Service Award from the United States Tennis Association, as well as the Local Hero Award from the City of Oakland for managing passage of an initiative to impose a sales tax on sugar-sweetened beverages sold in the city. In addition, this year is the 50th anniversary of legislation passed to establish the National Health Service Corps, which launched from a proposal he wrote and lobbied for while he was a young officer in the U.S. Public Health Service.

1970s

Norman Luban, M.D. '71, retired in 2019 after 42 years of practicing neurology. Along with celebrating his 50th Einstein reunion next year, he and his wife will mark their 50th wedding anniversary. He plans on enjoying his retirement with his family, including their grandchildren, in the Washington, D.C., area and on Cape Cod, where they own a second home.

Robert Ritch, M.D. '72, received the Bietti Medal from the International Council of Ophthalmology this year, which recognizes ophthalmologists who have contributed the most—through history, ethics, and education—to the advancement of ophthalmology. He also received a Lifetime Achievement Award from the Asia-Pacific Academy of Ophthalmology and the Gold Medal of the Tunisian Ophthalmologic Society in 2019.

Roger Duvivier, M.D. '74, continues to be honored by Einstein's department of obstetrics & gynecology and women's health and the office of diversity enhancement through the jointly sponsored annual Roger Duvivier, M.D., Lectureship. Dr. Jamila Perritt, an advocate for girls and women, delivered the fifth lecture in April 2019. Dr. Duvivier continues to volunteer with WINGS and with Rotary International in Guatemala. He would love to have his fellow alumni join him in Antigua.

Richard Frankenstein, M.D. '74, received a mastership from the American College of Physicians, a national organization of internists. Dr. Frankenstein is a solo practitioner in pulmonary diseases in Orange County, California, and has held positions in internal medicine at Riverside Medical Clinic, Hollywood Presbyterian Medical Center, and Henry Mayo Newhall Memorial Hospital. He has also held several positions with the California Medical Association.

Steven Kussin, M.D. '74, released his second book, *The Slippery Slope of Healthcare: Why Bad Things Happen to Healthy Patients,* in April 2020; it is dedicated to patient engagement, education, and empowerment. His first book, *Doctor, Your Patient Will See You Now: Gaining the Upper Hand in Your Medical Care*, was named a Top Ten Wellness title by Booklist and was reviewed by *The New York Times*.

Karen Lowenstein Kade, M.D. '76, retired from practicing dermatology last year and moved with her husband, Paul Kade, to the west coast of Florida. She loves retirement and living in Sarasota County. They have two grandkids, with another on the way.

Howard Reinstein, M.D. '78, was named "Physician of the Year" by the medical staff at Providence Cedars-Sinai Tarzana Medical Center in Los Angeles. He also received a Heart of Gold award from the Child Development Institute. And "more importantly," he says, his daughter, son-in-law, and two of his grandchildren have moved back to Los Angeles after many years of living in San Francisco.

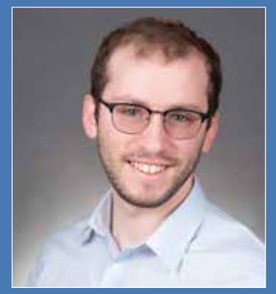
1980s

Michael Crain, M.D. '83, continues as chair of the department of radiology at Middlesex Hospital in Middletown, Connecticut (appointed in 2010), chief executive officer of Radiologic Associates of Middletown (2010), and executive director of the Patient Is U (TPIU) Foundation (2018). Dr. Crain developed and maintains several cancer-screening programs as well as TPIU to promote compassionate healthcare. He and his wife, Beth, have two sons—one in business, the other in healthcare—and care for an English bulldog, Turbo. His younger son, Jonathan, joined Einstein as a member of the Class of 2024 in August.

Stuart L. Marcus, M.D., Ph.D. '83, founded a company, SonALAsense, to develop a noninvasive drug/device in combination with sonodynamic therapy for the treatment of glioblastoma multiforme (GBM) and other cancers. The Ivy Brain Tumor Center in Phoenix, Arizona, will carry out the Phase 0/2 study in patients with recurrent GBM. The Ben and Catherine Ivy Foundation will fund the clinical-trial costs. The therapy is formed by the combination of two U.S. Food and Drug Administration–approved technologies: aminolevulinic acid GBM targeting and MRI-guided focused ultrasound.

Kenneth Paul Rosenberg, M.D. '83, released a book through Penguin Random House to accompany his new Sundance Film Festival and PBS film. Both are called *Bedlam* and detail the mental illness crisis in America. He is an

GUIDING PATIENT CARE WITH THE HELP OF A NEW APP



Yair Saperstein, M.D. '16, M.P.H.

Clinical guidelines, meant to guide evidence-based medicine, are often hundreds of pages long and aren't easy to thumb through when physicians are seeing patients. To help solve that problem, **Yair Saperstein, M.D. '16, M.P.H.**, co-founded a for-profit health technology company, avoMD. Its new mobile app allows physicians to sift through complicated guidelines and delivers up-to-date information at the point of care through a mobile phone or tablet.

Dr. Saperstein says the app "helps doctors effectively use the vast amount of available clinical knowledge to provide better care for their patients. It's an interactive and efficient way of accessing the guidelines."

A free version of the app can be found at www.avomd.io, and is downloadable on both Android and iPhone mobile devices. Dr. Saperstein notes that the app delivers evidence-based medicine and offers sources and links to supporting materials so that physicians understand the "why" behind the recommendations. (While the app is free for individual clinicians to try, medical departments interested in customizing the protocols for their specialties may do so only on paid private channels.)

Dr. Saperstein graduated from Einstein with distinction in global health research. He recently completed a chief residency in internal medicine at SUNY Downstate, working at Kings County Hospital in Brooklyn. AvoMD is his third startup; the first two are educational nonprofits that operate internationally: START Science (startScience.org) and TEACH (teach4kids.org).

A member of the Alpha Omega Alpha Honor Medical Society, Dr. Saperstein is an acclaimed classical concert pianist and a recreational ukulele jammer. He has received numerous honors, including being named to *Jewish Week*'s list of "36 under 36" most influential Jewish Americans, and was a semifinalist in the Dell Social Innovation Challenge.

STAY IN TOUCH

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addiction psychiatrist in Manhattan and lives with Lynn Novick on the West Side.

Lauren Plante, M.D. '84, has released her third book, *Respiratory Disease in Pregnancy*, which she co-edited with Stephen Lapinsky. Cambridge University Press published the book.

Myra Skluth, M.D. '86, received the Henry Gift Distinguished Internist Award from the Connecticut chapter of the American College of Physicians at its annual chapter meeting in October 2019. The award recognizes a lifetime of outstanding clinical service to patients and notable leadership within the local medical community.

Norman Saffra, M.D. '88, has partnered with the American Friends of Jamaica (AFJ) and Orbis International to support an inaugural blindness-prevention program in Kingston, Jamaica, which seeks to reduce the backlog of patients requiring surgery and to build capacity for residents at the University Hospital of the West Indies and Kingston Public Hospital. He performed more than 20 procedures in six days there. Dr. Saffra says, "Jewish tradition dictates that we participate in *tikun olam*—making the world a better place. Partnering with the AFJ and Orbis was a natural fit and allows me to follow in this tradition."

1990s

Panayiotis Ellinas, M.D. '91, has worked as a physician for refugees, partnering with nongovernmental organizations as a medical director in Cambodia and Kosovo. He also has worked in a clinic close to the Mexican border. His international work began while he was at Einstein, when he volunteered with the Thai Centers for Disease Control. His son just started university as a double major in physics and aeronautical engineering and wants to travel to Mars. His daughter is 13 and is extremely left-handed: she draws, listens to music, and writes. He sends his regards from Southern Illinois.

Ira Richterman, M.D. '91, recently received a promotion to president and chief executive officer of OMNI Orthopaedics and president of OASIS Ambulatory Surgery Center, both in Canton, Ohio. He is also the president of Starkap Captive Insurance Company.

Jose Ortiz Jr., M.D. '92, was named the 2020 Physician Citizen of the Year by the Wisconsin Medical Association, an honor given to physicians who have made significant contributions to their communities. Chief of staff at the Mayo Health Clinic in Eau Claire, Wisconsin, he is also on the hospital practice subcommittee and is part of the regional management team. Dedicated to public health initiatives and medical education, Dr. Ortiz works with the Chippewa Valley Free Clinic and Medical Experience Program, which introduces high school students to careers in medicine.

Peter J. Taub, M.D., M.S. '93, is a professor of surgery, pediatrics, dentistry, neurosurgery, and medical education at the Icahn School of Medicine at Mount Sinai in New York City. He serves as the program director for the division of plastic and reconstructive surgery, directing the Cleft and Craniofacial Center and the Vascular Anomalies Program.

Steven Thau, M.D. '94, was interviewed on CNN in May for his success in using an oxygen hood as an alternative form of oxygenation while decreasing the risk of contamination for critically ill COVID-19 patients, sparing more than 50 percent from having to be intubated. Dr. Thau is the chief of pulmonary and sleep medicine at Phelps Memorial Hospital Center in Sleepy Hollow, New York. He is also the father of Francesca Thau, a second-year medical student at Einstein.

Craig Zalvan, M.D., F.A.C.S. '95, released a book in September 2020, *Laryngopharyngeal and Gastroesophageal Reflux: A Comprehensive Guide to Diagnosis, Treatment, and Diet-Based Approaches*, which also details the benefits of a mostly plant-based, Mediterranean-style diet in the treatment of reflux disease. Dr. Zalvan is chief of otolaryngology and medical director of the Institute for Voice and Swallowing Disorders at Phelps Hospital in Sleepy Hollow, New York. He also is a partner of ENT and Allergy Associates in the Voice and Swallowing Division.

Christa Hoiland, M.D. '97, who is board certified in hospice and palliative medicine, started Optage Hospice in Roseville, Minnesota, in 2011 for Presbyterian Homes—the third-largest nonprofit senior housing organization in the country. In August 2019 she was named the hospice's medical director. Dr. Hoiland is a mother of three—18-year-old twins and a 14-year-old boy. She loves Latin dancing, doing cross-fit exercise, cross-country skiing, and enjoying good food.

2010s

Alan Sheyman, M.D. '10, recently returned to New York City and is a practicing medical and surgical ophthalmologist and retina specialist. He and his wife, Masha, have an adorable toddler who likes to create havoc every so often. Dr. Sheyman misses playing postexam basketball at the Einstein gym but does not miss the exams.

Jonathan Koenig, M.D. '13, married Dani Haber on Nov. 16, 2019, in Palm Springs, California. He received his fellowship at Rady Children's Hospital in San Diego. Since August 2019, he has been practicing pediatric orthopedic surgery in Brentwood, California.

Esther Mizrachi, M.D. '15, is an emergency medicine physician with Mount Sinai. She and her husband, Jacques, welcomed their first baby in April. One of Dr. Mizrachi's greatest memories is of her cloaking her sister, **Sarah Mizrachi, M.D. '19**, at graduation.

Ashley Eckel, M.D., Ph.D. '16, joined the University of Washington, Seattle, department of laboratory medicine, division of hematopathology, in July 2020 as an assistant professor.

A TRIBUTE TO COVID-19 FRONTLINE WORKERS

Major Michelle Cunningham, M.D. '13

U.S. Air Force Major Michelle Cunningham, M.D. '13, took part in a special military flyover of northern California medical facilities last May. She is a flight surgeon and family physician with the 99th Reconnaissance Squadron at Beale Air Force Base in California. The flyover honored the contributions of healthcare workers, first responders, and others combating COVID-19. Dr. Cunningham accompanied a pilot in one of four two-seat supersonic jets, all Northrop T-38 Talons.

"Even though I fly with my unit frequently, this flyover was surreal," she says. "We flew low over downtown Sacramento and the hospitals where I did most of my family medicine residency rotations. I could easily imagine the long hours, the constant worry, the change to family routines, and the life-changing challenges that COVID-19 was posing to my friends and colleagues at Einstein and New York City hospitals. Although my current work situation may be very different from theirs, I felt proud to be able to honor the work of all healthcare workers in the flyover. I hope they know just how much they are appreciated."

Photos courtesy of U.S. Air Force

Michelle Cunningham, M.D., looks out at the other supersonic jets flying in formation in honor of California healthcare workers battling COVID-19.

IN MEMORIAM

Montefiore Doctor Who Separated Conjoined Twins

James T. Goodrich, M.D., Ph.D., age 73, a renowned pediatric neurosurgeon who served Einstein and Montefiore for more than 30 years, died March 30, 2020, from complications associated with COVID-19, in the Bronx, New York.

Director of pediatric neurosurgery at Montefiore and professor in the Leo M. Davidoff Department of Neurological Surgery, of pediatrics, and of plastic and reconstructive surgery at Einstein, Dr. Goodrich dedicated his life to saving children with complex neurological conditions. He developed a multistage approach for separating craniopagus twins (those fused at the brain and skull).

In 2004 he gained worldwide recognition when he led a team of surgeons at Children's Hospital at Montefiore (CHAM) during a series of four operations over the course of nearly a year to separate 2-year-old boys Carl and Clarence Aguirre, who were joined at the top of their heads. In 2016 he led a team of 40 doctors in a 27-hour procedure at CHAM to successfully separate 13-month-old twins, Jadon and Anias McDonald. He was consulted on hundreds of cases, and he traveled the globe sharing his expertise.

Described as a humble and caring man by his colleagues, every year he baked holiday cookies and delivered them to the nurses at CHAM. Outside of work, he was known for his passion for historical artifacts, travel, and surfing.

"Jim was in many ways the heart and soul of our department—a master surgeon, a world-class educator, and a beloved colleague for all," says Emad Eskandar, M.D., professor and chair of the Leo M. Davidoff Department of Neurological Surgery, the David B. Keidan Chair of Neurological Surgery at Montefiore and Einstein, and the Jeffrey P. Bergstein Chair in Neurological Surgery at Einstein.

Born in Portland, Oregon, Dr. Goodrich served in the U.S. Marine Corps during the Vietnam War. He received his bachelor of science degree from the University of California–Irvine and his M.D./Ph.D. from Columbia University. His intern and residency training was completed at NewYork-Presbyterian Hospital and the New York Neurological Institute.

A fellow of the Royal Society of Medicine in London, Dr. Goodrich served as a member of the American Association for the Advancement of Science and the American Association for Neurological Surgeons.

In addition to his wife, Judy Laudin, he is survived by three sisters.

Shalom Buchbinder, M.D. '81, age 66, chair of radiology at the Brooklyn Hospital Center and a clinical professor of radiology and of obstetrics & gynecology and women's health at Einstein as well as a Talmudic scholar, May 2, 2020, Teaneck, New Jersey.

Michael Goldstein, M.D. '63, age 86, pulmonary medicine, Feb. 20, 2020, Delray Beach, Florida.

Stephan Kamholz, M.D., age 72, longtime member of the Einstein and Montefiore community, involved in early solitary lung transplants, chair of the department of medicine at Maimonides Medical Center, Brooklyn, June 11, 2020, Thornwood, New York.

Seligman Rosenberg, M.D. '59, age 85, retired ophthalmologist, member of Einstein's first graduating class, clinical assistant professor emeritus of ophthalmology and visual sciences at Einstein, and leader of the Dean's Club, June 28, 2020, Tenafly, New Jersey.

Herbert G. Vaughan Jr., M.D., Ph.D., age 90, director of Einstein's Rose F. Kennedy Intellectual and Developmental Disabilities Research Center from 1982 to 1993, first resident in neurology at Einstein, professor emeritus in the Dominick P. Purpura Department of Neuroscience, and professor emeritus in the Saul R. Korey Department of Neurology, May 28, 2020, Stamford, Connecticut.

Grisel Vazquez, age 67, senior administrative staff member in the department of medicine who retired in 2017 after 30 years of service, March 27, 2020, Bronx, New York.

Photo Credit: Archives of Associated Press

Protecting the Bronx

When pandemic flu threatened New York in 1957, Montefiore Hospital nurse Marjorie Hill received the first shot citywide, from Joseph Ballinger, M.D. Like today's coronavirus pandemic, the 1957–58 flu outbreak originated in China. It claimed 116,000 lives in the United States and was highly contagious, spreading to more than 20 countries in less than four months. The rapid development of a vaccine in this country—the U.S. Public Health Service released virus cultures to manufacturers in May 1957 and the vaccine entered trials in late July 1957—probably helped curb the number of deaths in the United States. E

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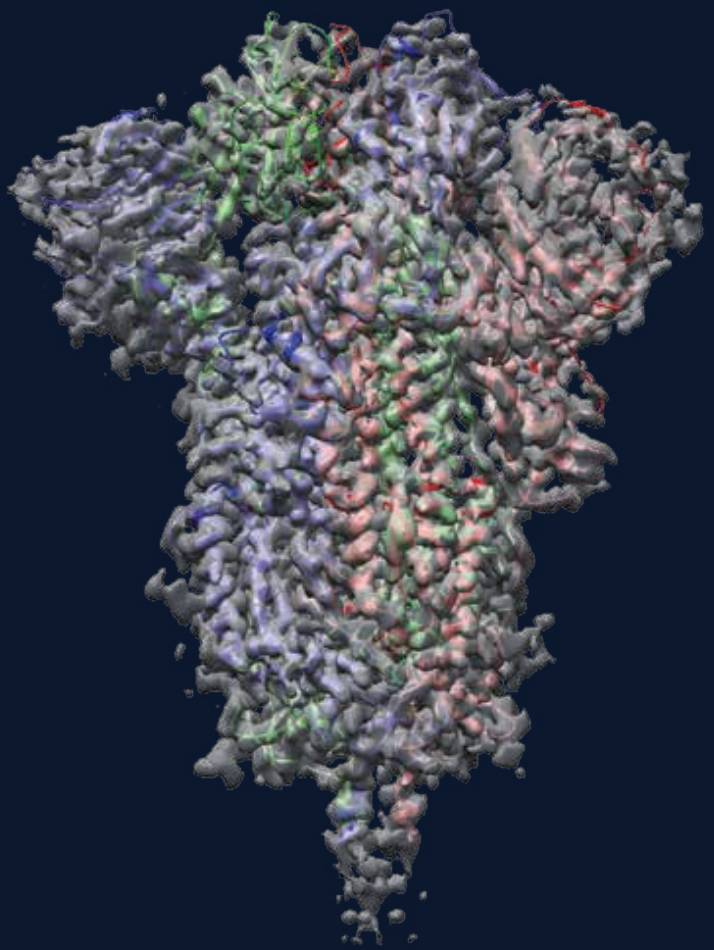

EINSTEIN IMAGE

The human antibodies that best neutralize the novel coronavirus bind to its spike protein. To develop antibody therapies, the laboratory of Steven Almo, Ph.D., needed to know where the best-neutralizing antibodies bind to the protein. Graduate students Natalia Herrera and Nicholas Morano obtained spike protein by expressing its gene in mammalian cells. The New York Structural Biology Center (NYSBC) then obtained cryo-electron microscopy images of ~50,000 particles of the protein. Ed Eng (NYSBC) and Jeffrey Bonanno, Ph.D., research assistant professor in Dr. Almo's lab, used computer programs to rapidly reconstruct those images into a molecular envelope (gray area), allowing the researchers to generate a high-resolution model of the protein's amino-acid strands (represented as blue, red, and green ribbons). Of greatest interest in this structural model of a spike protein is the top part: the "receptor-binding domain" that latches onto the ACE2 receptors of human cells and is targeted by neutralizing antibodies.

Image credit: Jeffrey Bonanno, Ph.D.