INSIDE Medicine
The Newsletter of the Department of Medicine

April 20, 2020

Researchers Join the COVID-19 Fight

A message from the chair, Dr. Steve Abramson

As we move through these challenging days of the COVID-19 pandemic, in addition to the incredible efforts of physicians, nurses and other healthcare providers, we are now witnessing the emergence of the next phase in the battle, as our research community joins the COVID-19 fight. This issue highlights the leading efforts of Dr. Mark Mulligan's team in the development of COVID vaccines, as well as the large number of clinical trials that have been initiated in the last month. These trials, reviewed by Dr. Judy Hochman in this issue, include randomized trials of Remdesivir, hydroxychloroquine, anti-coagulation, anti-IL-6 blockade and convalescent plasma. An "army" of clinical researchers, coordinators and grants administrative staff has been mobilized in an unprecedented fashion to implement these trials, so that in the future our physicians will have an armamentarium of effective drugs and vaccines to combat the likely reemergence of COVID-19.

What is striking is not only the speed at which NYU research efforts have been launched, but the fact that a number of investigator-initiated protocols have emerged from the keen eyes of physicians facing deadly and rapidly changing clinical scenarios. For example, working in partnership with pathologists, both macro- and extensive micro-thromboses have been noted in association with rising D-dimers, which have led to biomarker-triggered anti-coagulant treatment. Most recently, our nephrologists have described the appearance of previously

unappreciated frequency of renal failure. They have sounded a clarion call that has brought national attention to the need for more dialysis machines and trained nursing staff. The cause and treatment of renal involvement will no doubt prompt additional clinical research studies to combat COVID-19.

Through the efforts of our clinicians and researchers, we will emerge with a greater reason for optimism in the fight against COVID-19.

Artist's Statement: Michael Natter, MD

As a doctor, we are very much on the front lines, but so are many of our other colleagues—especially the nurses that we work with. Often, it is our nursing peers who are needed to repeatedly go in and out of patient rooms, constantly exposing themselves to COVID-19. A nursing friend of mine posted a captivating and moving selfie in her PPE on her social media. Her eyes spoke to me. There was a sense of courage, pride, and fear that was starring back at me behind her face shield. Despite the rest of her face being hidden behind her N95 mask, her face carried all of the emotion and expression that we are all carrying during this difficult time. I was compelled to draw her. After completing the portrait, I thought about telling her story to celebrate her courage but also express the hardships we all share.

Click on the image above for a closer look.

New Vaccine and Treatment Evaluation Unit will Accelerate COVID-19 Research in NYC

NYU Grossman School of Medicine is among an elite group of ten institutions just selected by the National Institute of Allergy and Infectious Diseases (NIAID) to join the network of Vaccine Treatment and Evaluation Units (VTEUs).

Located at premier institutions across the United States, the VTEUs are charged with conducting clinical trials of vaccines and treatments for infectious diseases that threaten public health. The current COVID-19 pandemic is the first major target for initial research projects.

“We’re thrilled to be joining this group of experts,” said Dr. Mark Mulligan, principal investigator for the VTEU, and director of the Division of Infectious Diseases and Immunology and the Vaccine Center. “This award positions us as a leader in innovative vaccine research and testing, as well as biologics and predictive biomarkers for infectious diseases.”

The seven-year award, which will provide nearly $4.2 million in base funding, also makes history. Though the VTEU program has existed at NIAID since 1962, this is the first time that an institution in New York City has been selected. While Dr. Mulligan has already hired prominent researchers from Emory and the University of Pennsylvania to join the Vaccine Center, his main goal is to

collaborate with faculty researchers and clinicians at NYU Langone. “We’re really in a growth phase,” he said, “and we have extraordinary talent right here.”

One immediate research focus is expanding antibody testing to determine how many of our healthcare workers have been exposed to the novel coronavirus, and how their immune system has reacted. This will help researchers begin to determine whether there is a type of protective immunity for people who have been infected with COVID-19 and have recovered, and for those who have been exposed but not been ill themselves. Dr. Mulligan also anticipates that a COVID-19 vaccine trial will begin in May or June, in collaboration with other members of the VTEU.

NYU Grossman School of Medicine’s VTEU includes collaborators across multiple departments including pediatrics, the Cancer Center, and microbiology. Subsites include the U of Miami and Universidade Federal de Minas Gerais (UFMG) in Brazil.

NIAID, a part of the National Institutes of Health, is directed by Dr. Anthony Fauci. Other VTEUs include Baylor College of Medicine, Cincinnati Children’s Hospital Medical Center, Emory University, Kaiser Permanente Washington Health Research Institute, Saint Louis University, University of Maryland Schools of Medicine, University of Rochester, University of Washington, and Vanderbilt University Medical Center.

Uncovering Potential Covid-19 Treatments

Judith Hochman, MD, Senior Associate Dean for Clinical Sciences, shares how NYU Langone Health's research teams are currently working on an impressive number of clinical trials to prevent and treat Covid-19. "We've watched with great pride as our people have joined together, worked overtime, and volunteered to treat and study this disease," says Dr. Hochman. "We want our community to know that we're here, dedicated to providing the best care, and to providing innovative ways to prevent and treat Covid-19 as quickly as possible." Find out more about the clinical trials NYU Langone is working on.

Public Hospitals and Pandemics: The View from Bellevue

For nearly three centuries, Bellevue has been a pioneer in dealing with pandemics. Staffed entirely by physicians from the newly named NYU Grossman School of Medicine—a partnership that dates from the 1840s—the hospital remains a microcosm of the health needs and afflictions of the world's most diverse city. It's no surprise, therefore, that the NYU/Bellevue partnership has produced a Who's Who of distinguished researchers and clinicians in infectious disease: Walter Reed and William Gorgas (Yellow Fever); William Hallock Park

(Diphtheria); Albert Sabin and Jonas Salk (Polio); Hermann Biggs and Edith Lincoln (Tuberculosis); Fred Valentine, David Ho, and Alvin Friedman-Kien (HIV/AIDS)—the list goes on.

Now COVID-19 has been added to that list.

“Of all of the crises that we’ve faced at Bellevue, I feel like this is the grandaddy of them all,” says Doug Bails, MD, chief of medicine at Bellevue. “It is the biggest challenge of my career.”

In 2014, Bellevue was one of only a handful of institutions in the United States to safely and successfully treat a patient with Ebola. It has since partnered with Emory University and the University of Nebraska, with support from the U.S. Centers for Disease Control & Prevention, to form the National Emerging Special Pathogen Training and Education Center (NETEC). Bellevue now provides training to prepare other U.S. health care facilities to face emerging special pathogens. As Dr. Bails notes, this left it “one step ahead of the wave. That makes a big difference, saves a lot of lives.”

In late March, other hospitals in the NYC Health + Hospitals system—particularly those in Queens and Brooklyn—were overwhelmed with a staggering number of COVID-19 patients. “When people heard these hospitals were in trouble, there was a ‘put me in, coach’ type of attitude at Bellevue,” says Dr. Bails. “That aligned us all.”

Building on its ‘turn no one away’ spirit, Bellevue began accepting 30-40 transfers a day from these hospitals in late March. On March 30, Bellevue had 192 COVID patients. By April 12, there were close to 400 patients, essentially doubling the numbers in a two-week period. “I’m very proud of how our team was able to manage this,” says Dr. Bails. “Some of these patients were very ill. We set up an infrastructure and a special set of triage maneuvers to try to keep them safe.”

One of the keys to success in this unprecedented situation was the ability to build teams to accommodate the surge in patients, with doctors, housestaff, and other healthcare professionals from each department and division stepping in to help. According to Dr. Bails, “We were able to build a machine.” He also credits the facilities management team at Bellevue, which not only converted existing

spaces to create new inpatient areas, but opened up ten new units with negative pressure rooms and working space with computers and telephones.

Before the COVID-19 crisis, the medical ICU would typically have 10-12 patients on an average day. It now has more than 100 patients, distributed throughout all of the ICUs and three satellite areas. Some ICU patients are in shared rooms—though not on shared ventilators—which helps the ICU staff caring for them.

“This disease is difficult,” says Dr. Bails. “We are doing all the supportive measures we need to do, but we still don’t have the underlying therapy that we know works.”

One supportive measure is a type of positional therapy called proning, in which patients are placed on their stomachs to combat acute respiratory distress syndrome. Adjustments to other treatments have also been necessary, particularly in relation to renal injury, which not only appears to be predominant among those hospitalized with COVID-19, but also seems to behave differently in these patients. With so many needing treatment, the hospital has created a three-track system of treatment: the most common type of dialysis—hemodialysis—in which blood is purified in an intensive three-hour session; Continuous Veno-Venous Hemofiltration (CVVH), in which blood is filtered slowly over 24 hours; and what Dr. Bails calls the “old standby, which has been rediscovered by many hospitals”—peritoneal dialysis, a treatment that uses the lining of the abdomen and fluid to make the exchange of toxic substances in the blood.

The supportive measures also reach beyond the hospital, as discharged patients are now being followed up on with a special type of telehealth created for this unique situation. When a patient has recovered from COVID-19 enough to be discharged, they still need support—from general advice to specific medical issues that need attention. “We’re trying to figure out the best way to create situations in which they don’t have to come back to the hospital,” says Dr. Bails. “It’s been very useful.”

The Historian Is In: Science, Gender, and the Epidemic-Ending Polio Vaccine

David Oshinsky, PhD
Professor of History and Medicine
Director, Division of Medical Humanities

The history of past epidemics can provide important perspective on the current COVID pandemic. In each issue of the newsletter, we will revisit a past epidemic, from Yellow Fever to Ebola.

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As the world mobilizes against COVID-19, the key to eradication lies in the development of a successful vaccine. Smallpox remains the only infectious human disease to be wiped from the face of the earth; polio, currently down to fewer than 100 cases per year, is predicted to be next. What both diseases have in common is the power of vaccination.

Polio was among America's worst nightmares in the "baby boom years" following World War ll—a Summer Plague that killed thousands of children and paralyzed
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many thousands more. Movie theaters stood empty, swimming pools were padlocked, youngsters struggled to walk and to breathe, hospital wards were lined wall-to-wall with iron lungs.

The story of polio has become, in large part, the story of Jonas Salk and Albert Sabin—two indefatigable researchers, funded by the March of Dimes, who clashed bitterly in the race for a vaccine. Both men were graduates of NYU Medical School, and both had been mentored by giants in the budding field of virology. Salk had gravitated to Dr. Thomas Francis, whose work on influenza revolutionized the study of virus strains, while Sabin had studied under Dr. William Hallock Park, who helped develop the life-saving diphtheria antitoxin. Why Salk and Sabin chose NYU is no mystery. Medical schools in this era—Harvard, Yale, and Columbia, among many others—had strict quotas restricting the number of Jews. For Salk and Sabin, quota-free NYU was the only game in town.

By October, the pandemic had felled thousands of New Yorkers. As it spread, the City Health Department banned spitting in public as well as “promiscuous coughing and sneezing.” It also sent nurses throughout the five boroughs to visit the sick—there was no mandatory quarantine—and to staff the armories set up as auxiliary hospitals. To prevent crowding on the subways, the city mandated staggered working hours and forced theaters to cut their ticket sales in half. Public schools remained open, but only because the health commissioner thought the classrooms to be safer for children than the slums where so many of them lived. Public libraries stopped lending books, gauze face masks became regular attire, and people stopped shaking hands.

What is too often lost in the telling of the polio story, however, is the extraordinary role played by two female scientists: Dorothy Horstmann at Yale and Isabel Morgan at Johns Hopkins. Experimenting on chimpanzees, Horstmann (right) set out to find the pathogenesis of polio—its route through the body. Researchers then believed that poliovirus entered through the nose, traveled to the brain and into the central nervous without ever entering the bloodstream. Horstmann proved that poliovirus entered via the mouth, traveled through the digestive tract, and briefly circulated in the bloodstream before entering the central nervous system. This meant that a vaccine designed to raise antibody levels in the blood might

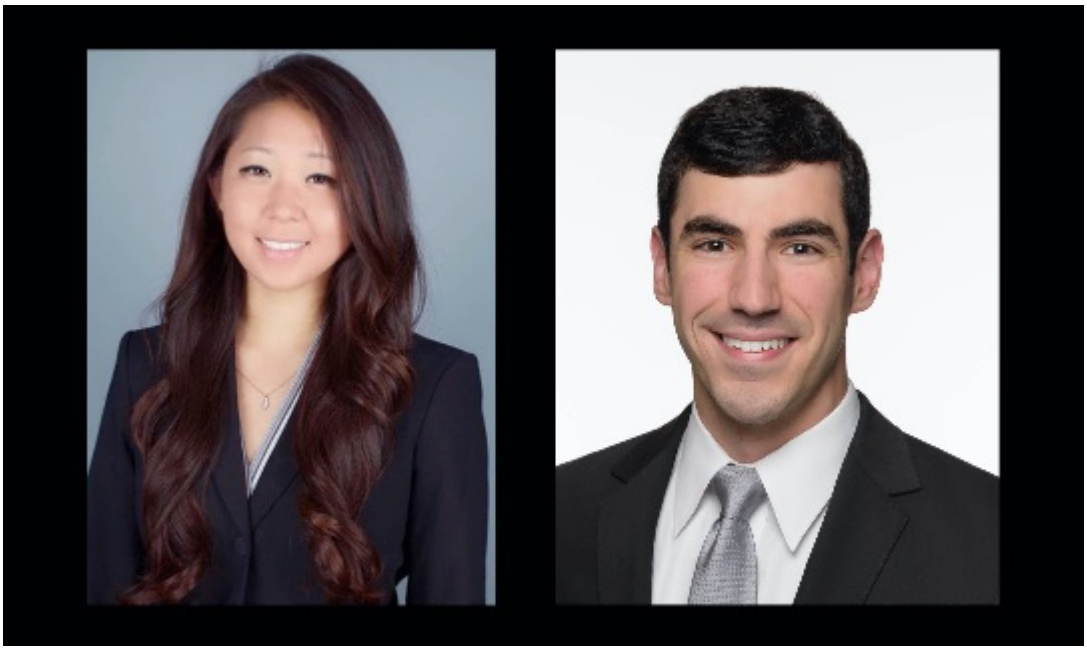
neutralize the virus before serious harm was done. Her work, most researchers believed, offered Salk and Sabin a clear path to success.

At Johns Hopkins, meanwhile, Isabel Morgan (right) took the next logical step. The daughter of Nobel Prize-winning scientist Thomas Hunt Morgan, she'd come from the Rockefeller Institute, where, according to one colleague, "few PhD ladies ever had much of a chance for advancement." Portrayed in one human interest story as "a young lady with unswept blond hair and sparkling blue eyes" who liked nothing better than "to fuss and putter about the kitchen," Morgan offered advice that many in that era thought clearly out of place. "Girls," she said, "should be encouraged to reach for the heights too."

Morgan's experiments to immunize monkeys against polio brought very promising results. Her primates, vaccinated with a killed-virus solution, were able to withstand high concentrations of live poliovirus without succumbing to the disease. But in 1949, in the prime of her career, the 38-year-old Morgan left Johns Hopkins to marry and become a homemaker. Had she remained, it's quite possible she would have beaten Jonas Salk to the killed-virus vaccine. The next step involved the testing of children, one she never got to make. "It was a tremendous blow for Hopkins and for polio research, but everyone understood," a friend recalled. "Isabel had a choice to make, and she made it."

Dr. Horstmann never married. She devoted her life to science, pursuing the mysteries of infectious disease, including the development of a measles vaccine. Along the way, she became the first female professor of medicine at Yale, the first woman there to hold an endowed chair, and an elected member of the National Academy of Sciences

Today, a bust of Isabel Morgan is displayed at the Polio Hall of Fame in Warm Springs, Georgia—the lone female among the seventeen scientists so honored—while a portrait of Dorothy Horstmann hangs in the "Gallery of Luminaries" at Yale Medical School, one of three women among the fifty-two men gracing the walls. In honoring Salk and Sabin, as we should, it's worth remembering that the polio vaccine was a fully collaborative effort in which women scientists played an absolutely essential role.



Early Graduates on Their Decision to Join the Fight

Dainn Woo and Benjamin Marshall, who were among the early graduates of the class of 2020, describe their decision to join in the fight against COVID-19.

Dainn Woo: I am one in 53 students who made the decision to graduate early from medical school to join the current fight against COVID-19. For many of my classmates, the decision was tough, as it certainly should be. Most of us have family, significant others, and our own health to think about. Fortunately, I don't live with my parents, so the fear of getting them sick wasn't a factor for me. When I received the email confirming that I was eligible to graduate and join the workforce, my decision came naturally. Years ago, I chose a career in medicine to do good no matter how difficult, to support those who need my care in their darkest times, and now I was being asked to step up to the plate. For me, being able to do something to help felt infinitely better than the idea of sitting in the safety of my home, anxiously watching news reports of hospitals flooding with patients. I think most my class feels similarly, and I applaud my peers who were able to find ways to help, such as organizing virtual family visits or helping gather PPE for our healthcare workers. Also, I am incredibly impressed with our administration which was able to get us successfully onboarded within a couple of weeks.

One week into working at Tisch/Kimmel and Bellevue, I realized that one of

the most unfortunate aspects of this pandemic is that visitors are not allowed in the hospital, even to say goodbye to their loved ones. The emergency medicine department rolled out a program called Fam-Comm, where we update our patients' families and give them a chance to talk through the phone or video chat with the patient. This program has been one of the most poignant experiences for me these past few days. Today, I spoke with the son of one of our patients in the ICU. I updated him on the patient's condition and informed him she was sedated and intubated, but if he wanted to say a few words to her, I would gladly hold the phone to her ear for as long as he needed. I geared up in my PPE and put my phone in a plastic biohazard bag before going into the patient's room. I stood there for 15 minutes while the son spoke to his mother, choking through tears as he offered words of encouragement. When the call ended, I gave myself a few minutes to recover before I dialed the next family on my list. Once in a while, I hear Journey's "Don't Stop Believing" playing throughout the hospital, indicating that an inpatient with COVID-19 has been safely discharged. I let myself imagine how relieved and happy the patient and their family must be, which gives me tidbits of strength through my day.

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Benjamin Marshall: I would be lying if I said that the first reaction I had upon receiving the email asking if we would volunteer to graduate early to help with the COVID-19 crisis was to immediately reply yes and jump into the fray. In truth, is was quite the opposite: to come up with reasons why I shouldn't do this. Becoming an intern for an extra month or two is a big ask. The intern year is among the most demanding in terms of working hours and the learning curve. The gap between graduation and the normal start of my residency in July was supposed to be a time to enjoy a reprieve from the hard work I'd done the past four years—a time to travel, to hang out with friends, before starting the strenuous road that is residency.

I also had fears about being exposed to the virus, and worst-case scenarios went through my head. Yes, older patients are more at risk, but young patients have suffered at the hands of the virus as well. Part of me felt that I'd be more of a hindrance than a help. There is so much to know about actually caring for patients that I worried whether the senior residents and attendings could take the time to guide me. And part of me felt guilty for thinking of these excuses not to volunteer when other classmates were enthusiastically signing on, anxious to put their medical education to good use in an unprecedented emergency.

Over the next few days, I realized that volunteering would not be taking away
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time to celebrate finishing medical school. The virus had already done that! What became obvious, given the shortage of health care workers in the hospitals I'd come to love during my medical school years, was that extra hands were essential. I'm excited to be able to start my career helping to deal with this crisis and I believe it will ultimately help me be a better intern when I start my actual residency come July.

I cannot say I have absolutely no fears or doubts, but I entered this field to make a difference in people's lives, knowing that risk is part of the bargain. It's time for that journey to begin.

COVID-19 Links

Department of Medicine intranet site
Department of Medicine COVID-19 blog

Inside Health (atNYULMC) home page, for daily posts and articles

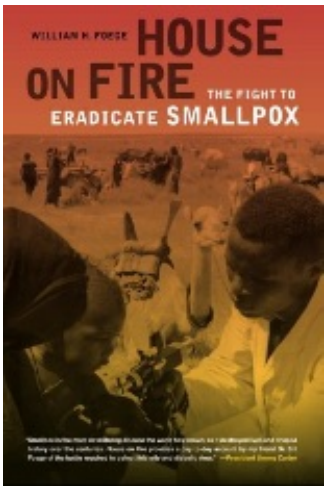
Covid-19: What You Need to Know - Information Hub

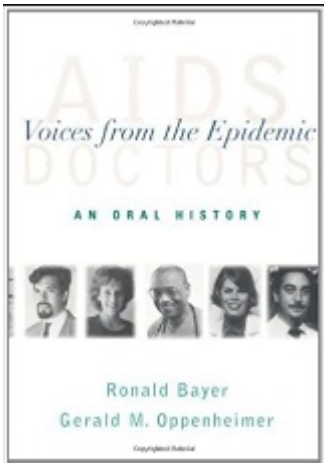
Resources for Managing and Surviving the COVID-19 Crisis
With thanks to Dr. Sandy Zabar and the DGIMCI team for compiling this resource guide of COVID information, complete with CME activities, mental health and emotional support, activities for parents and children, and free journal access.

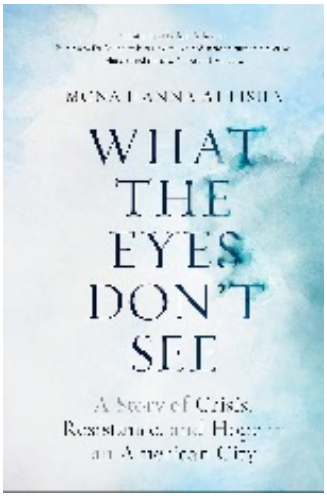
Share Your Creative Work

If you are interested in submitting an essay, poem, or artwork related to the COVID-19 pandemic, we'd love to take a look. We will feature selected work in upcoming issues. Email your submissions to DOMCommunications@nyulangone.org

Recommended Reading: On the Front Lines







***House on Fire: The Fight to Eradicate Smallpox*, William H. Foege**
The eradication of smallpox in the 1970s stands as one of the greatest triumphs in public health, and indeed modern medicine as a whole. Bill Foege, a physician and epidemiologist, was one of the key figures in creating a global strategy of surveillance and containment to defeat the disease. A personal account of his incredible efforts working in Nigeria and India, this book also puts a human face on the disease.

***What the Eyes Don't See: A Story of Crisis, Resistance, and Hope in an American City*, Mona Hanna-Attisha**
Pediatrician Mona Hanna-Attisha, MD, was among the first to recognize—and prove—that the children of Flint, Michigan were being poisoned by lead in their drinking water. This public health crisis became national news in 2015, largely due to her relentless efforts to not allow the state government to ignore and evade the issue. *Kirkus Reviews* calls the book “an important contribution to the literature of environmental activism—and environmental racism.”

In 2019, Dr. Mona (as she is often called) received the inaugural Vilcek-Gold Award for Humanism in Healthcare, awarded jointly by the Vilcek and Gold foundations to immigrants who have demonstrated extraordinary humanism in American healthcare practice.

***AIDS Doctors: Voices from the Epidemic,* Ronald Bayer and Gerald M. Oppenheimer**

The evolution of the AIDS epidemic is presented as a collective oral history, featuring interviews with over 75 physicians—clinicians and researchers alike—who bore witness to the early years of the disease. By capturing these doctors' experiences in their own words, the book is an important historical document that preserves memories and emotions that would otherwise be lost to time. Recollections from several NYU physicians—including Drs. Alvin Friedman-Kien and Linda Laubenstein, who co-authored the first published article on the appearance of Kaposi's sarcoma in gay men—are included.