

Columbia Medicine

2020-2021 ANNUAL REPORT

Columbia University Vagelos College of Physicians & Surgeons



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A Year of Opening Doors to Opportunities

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Faculty Confront Structural Racism in Health Care

Faculty and staff quickly began implementing recommendations made by a task force that studied structural racism in health care. Projects include an initiative to improve representation and inclusion in the family medicine residency, a new office of equity, diversity, and inclusion in the Department of Psychiatry, and workshops for medical students who have experienced racism.



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The Precipice of Change

As a national leader in medical education, Monica Lypson was a natural choice to advise VP&S on choosing a new education dean. The more she learned about the position, the more intriguing it became, and she decided to be considered for the job. One of her goals is to identify the implicit values that consistently make VP&S graduates top candidates in the residency match.



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We Must Do More: “COVID Anywhere is COVID Everywhere”

A small group of VP&S faculty spent years planning a program about global health security. Then came a pandemic. The organizers recognized that addressing an outbreak of this scale in real time was a once-in-a-generation opportunity. The result was a five-day online symposium that attracted thousands of participants.



On the Cover

From developing new programs to address structural racism to strengthening the curriculum to planning for the next global health crisis, the Vagelos College of Physicians and Surgeons community embraced entry into new opportunities during 2020-2021. The cover shows an important entry point for the education mission: the Vagelos Education Center on Haven Avenue.

Photograph by Jörg Meyer

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2020–2021 VP&S Annual Report

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Progress and Strength Through Leadership



BARBARA ALPER

Our 2020-21 fiscal year was defined by two challenges that shaped the way we carry out our missions in education, patient care, research, and community service: the pandemic and structural racism. Strides in both areas have strengthened and transformed us.

Many programs have been put into place to turn anti-racism into pro-diversity, inclusion, equity, and belonging for our faculty, staff, students, patients, and neighbors. The medical center task force appointed in July 2020 worked quickly and thoughtfully to develop actions needed to reinforce the medical center's values of diversity, multiculturalism, and inclusiveness. Working groups within the task force reviewed curricular content, community partnerships, health disparities research, and clinical programs. By fall, the task force issued a report that outlined specific action items, and implementation of the recommendations began in January 2021.

Within the pages of this annual report, you will read about exciting projects underway to bring about change. The recruitment of a national education leader, Monica Lytson, MD, as vice dean for education promises to usher in a new era in medical and interdisciplinary education. Long a leader in pursuing anti-racism in academic medicine, Dr. Lytson plans to foster a diverse and inclusive learning environment to ensure that patients receive equitable and quality health care.

You can read more about our diversity, equity, and inclusion programs and see the full report from the task force at www.cuimc.columbia.edu/about-us/diversity-equity-and-inclusion-cuimc.

We continued to study COVID-19, work in partnership with NewYork-Presbyterian to treat COVID-19 patients, and, most importantly, help vaccinate our community, patients, and neighbors. We were proud to contribute to vaccine development by participating in

national clinical trials. When vaccines were approved, we worked with NewYork-Presbyterian to vaccinate over 150,000 patients, faculty, staff, and students during the year. That number includes nearly 73,000 neighbors vaccinated in the Armory on our campus and 700 other New Yorkers vaccinated in Manhattanville pop-up vaccination events. Our researchers identified variants that raised public awareness and vigilance, we developed new rapid and less expensive tests, and we redeployed staff where needed to ensure continuity of care of hospitalized patients. We also continued to support the mental health of our faculty and staff through our unique CopeColumbia program.

We did not limit our vaccine advocacy or expertise to our neighborhood or city. VP&S faculty members spent years planning a program to address global health security and in 2019 had a grant to raise awareness of the importance of vaccines in pandemic preparedness. As a real pandemic unfolded, the organizers quickly pivoted to planning a five-day online symposium, which attracted thousands of participants from around the world. The February 2021 event was one of the highlights of this year's contributions to pandemic understanding and planning for inevitable future pandemics.

Patient care has been strengthened through new primary care practices, expanded use of telemedicine, and new initiatives, including the new Cohen Center for Health and Recovery from Tick-Borne Diseases, New York City's first center to offer dedicated and specialized care for patients with Lyme disease and other tick-borne diseases.

In education, we celebrated a milestone—the centennial of the first women to receive MD degrees from Columbia. Students are benefitting from a new emergency medicine clerkship, and the first class of genetic counseling students graduated. Our historical No. 4 ranking in the U.S. News & World Report ranking



MICHAEL DIVITO

of research-oriented medical schools reinforces the impact Columbia has on training the next generation of medical professionals.

New community programs include vision screening for older residents of some New York City Housing Authority developments in Washington Heights and East Harlem, a partnership between the New York Public Library and the Department of Psychiatry to offer mental health resources, and a partnership with the Taxi and Limousine Commission, which grew out of efforts to educate taxi drivers about the COVID-19 vaccine but now includes a wider effort to promote health and wellness among drivers.

A record amount of research funding was received from the National Institutes of Health for the 2020 federal fiscal year even though much of our non-COVID research was suspended at the height of the pandemic. The \$496 million we received ranked us No. 5 among medical schools in NIH funding. This record ranking was a move up from No. 9 the previous federal fiscal year. I invite you to read the many highlights that describe our research findings, includ-

ing work that links psychological stress to graying hair in people (and the restoration of hair color when stress wanes), new uses of the genomic editing system known as CRISPR, and images of a transporter molecule that shuttles omega-3 fatty acids into the brain, a finding that may open the door to delivering neurological therapeutics to the brain.

The 2020-21 year has been one of great accomplishments in spite of historic challenges. That we continued to lead in our traditional strengths is a testimony to our faculty, staff, and students and to our many friends and supporters. Thank you for providing the foundation for our success.

Sincerely yours,

Anil K. Rustgi, MD

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Volunteers at an April 2021 pop-up COVID-19 vaccination event in Manhattanville

FACULTY CONFRONT STRUCTURAL RACISM IN

In December 2020, *Academic Medicine*—the journal of the Association of American Medical Colleges—published “Learning from the Past and Working in the Present to Create an Antiracist Future for Academic Medicine.” The pointed op-ed sounded a clarion call to action.

“The murders of George Floyd, Breonna Taylor, Rayshard Brooks, and others by the police in 2020 sparked demands across the United States and around the world to end systemic racism against Black people,” wrote the coauthors, a subset of the journal’s editorial board who are all members of groups underrepresented in medicine. “These instances of appalling violence occurred during the COVID-19 pandemic, which magnified longstanding health disparities in the Black community. The combination of violence and illness has provided a catalyst for action and an opportunity for change in academic medicine.”

In June 2021, one of those coauthors, Monica Lypson, MD, became vice dean for education at VP&S. She oversees the MD program, including curriculum,

financial aid, student affairs, and research. And she has pledged to extend the vision articulated in the *Academic Medicine* op-ed to foster a diverse and inclusive learning environment not only within the medical school but also across Columbia University Irving Medical Center to promote equitable, high-quality health care for all patients.

Dr. Lypson’s efforts will expand on plans laid in the summer of 2020 when CUIMC leadership created a task force to identify actions to move VP&S and Columbia’s other health sciences schools toward the university’s vision of an anti-racist, multicultural, and inclusive institution. The task force was cochaired by Olajide Williams, MD, professor of neurology, and Rafael Lantigua, MD, professor of medicine, and coordinated by Anne Taylor, MD, vice dean for academic affairs in VP&S and senior vice president for faculty affairs and career development at CUIMC.

Many of the action items identified by the task force extend and amplify isolated efforts already underway at a smaller scale in individual departments and



HEALTH CARE

**PILOT PROJECTS
PLANT THE SEEDS
OF CHANGE**

By Brittany King

programs across VP&S. In October, Columbia's Office of the Vice Provost for Faculty Advancement awarded funds to 57 pilot projects across the university conceived to dismantle structural racism; 26 of those initiatives involve VP&S faculty. The projects aim to increase recruitment of underrepresented minorities in medicine, expand access to health care, retain minority talent, and update the curriculum to address structural racism. Several of the projects tackle specific clinical issues, such as race-based reporting on kidney function, health access and quality for Black patients with liver disease, mental health issues in the Black community, and racial disparities in telemedicine access for orthopedic health care during the pandemic.

"Naming structural racism is not enough," says Dr. Lypson. "If change is to happen, it takes more than statements. It takes long-term, sustained action and significant funding. These pilot grants awarded to VP&S faculty provide the monetary resources to encourage collaboration, dialogue, and action to create systemic change at the medical school and honor the longstanding commitment of many of our faculty to confront the impact of racism on health care."

WOMEN EMPOWERING WOMEN

Stephanie Lovinsky-Desir, MD, assistant professor of pediatrics, was just two years into her VP&S appointment when she received a KL2 Mentored Career Develop-

ment Award from the NIH for a project to investigate the influence of physical activity level and air pollution exposure in asthma. The two-year bridge program for new faculty provides mentorship, exposure to research across disciplines, and support for patient-centered investigations.

For Dr. Lovinsky-Desir, informal features of the award had a powerful effect on her career. Over time, the women in her KL2 cohort at VP&S connected across the departments in which they hold appointments. They studied together, shared research ideas and findings, swapped advice. They began meeting weekly to set goals and hold one another accountable, and over time they became close. Conversations about work and research blended into reflections on their childhood aspirations or their future dream jobs.

"The meetings provided a therapeutic place to get advice from others who were literally walking through the same trenches around the same time," says Dr. Lovinsky-Desir. "We encouraged one another to go after grants, shared tips on navigating the research landscape, swapped writing samples, celebrated published manuscripts and successful applications, and provided support for all of the bumps along the way."

Six years later—and four years after the KL2 cohort ended—the women still meet, now as part of ASPIRE!, a mentorship and



Members of the ASPIRE! group, from left: Teresa Lee, Pediatrics/Cardiology; Brett Anderson, Pediatrics/Cardiology; Gissette Reyes-Soffer, Medicine; Stephanie Lovinsky-Desir, Pediatrics/Pulmonology; Lauren Chernick, Emergency Medicine; Marisa Spann, Psychiatry; and Jennifer Woo Baidal, Pediatrics/Gastroenterology

networking group for women in STEM at Columbia established to extend the informal benefits its founders realized early in their careers. Participants swap feedback on their research proposals, grant applications, and other ongoing projects and promote professional development. Public events bring together women (and men) in STEM to talk about their careers, families, and, more recently, coping through the pandemic. Says Dr. Lovinsky-Desir, "Creating groups of like-minded peers who share common goals yet come from different backgrounds can be an invaluable approach to support those who ASPIRE to succeed in academic medicine."



Stephanie Lovinsky-Desir

Community-minded

Columbia patients represent myriad countries and cultures. Some need health care providers who can communicate in languages other than English. Others worry about how they will be able to afford care. Few of their doctors have lived through such challenges themselves. As an inpatient family medicine hospitalist at the 200-bed Allen Hospital, Himabindu Ekanadham, MD, who speaks both Spanish and Telugu, the official language of the Indian states of Andhra Pradesh and Telangana, has had ample opportunity to witness the chasm in lived experience between patients and health care professionals.

In the aftermath of George Floyd's death and the first COVID-19 wave—during which patients and staff at the Allen were particularly hard hit—Dr. Ekanadham grew frustrated with the messages of shock and disappointment shared in the news and among her colleagues, friends, and family. “I felt like it wasn't enough,” says the assistant professor of medicine in the Center for Family and Community Medicine. “Saying that racism is wrong wasn't changing much for our patients or the community we are in.” So, Dr. Ekanadham, who has twice won the American Academy of Family Physicians' Exemplary Teaching Award and was her residency program's physician teacher of the year in 2018, launched a monthly video call for the Center for Family and Community Medicine that was open to all faculty, residents, and staff to brainstorm actions they could take with the support and presence of department leadership.

When the opportunity for grant funding arose, Dr. Ekanadham and seven colleagues proposed “Addressing Racism Through Education, Intentional Recruitment, and Advocacy” to implement strategies they had identified in their video calls to improve representation and inclusion in the family medicine residency program at New York-Presbyterian and retain trainees who match to the program.

“Historically in medicine, there is a huge amount of exclusion of various groups of people because of structural racism and resources that are not equitably allocated in terms of higher education and advancement opportunities. It's set up that the people who make it into medical school and later on into residency are already isolated into these higher groups of privilege, which tend to be comprised of people who are white,” says Dr. Ekanadham. “Working in an urban, underserved community, there's a stark difference between us doctors and the patients we care for in terms of what we look like, our lived experiences, and the language(s) we speak. This is a big problem because data shows that patients feel more connected to and trust physicians who look like and speak the same language as them. There is a premise here that part of healing involves relatability, which translates into a richer form of empathy.”

The “Addressing Racism Through Education, Intentional Recruitment, and Advocacy” project has three main goals: to educate family medicine faculty and residents on the pervasiveness of racism and how it affects their peers and patients; to form an admissions commit-

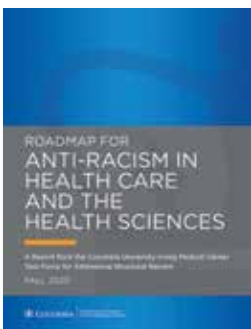


Himabindu Ekanadham

“Data shows that patients feel more connected to and trust physicians who look like and speak the same language as them.”

tee that will help increase the recruitment and retention of underrepresented applicants; and to create a community medicine advocacy track within the family medicine residency program, through which participants will gain skills in physician advocacy and community engagement.

Already, the admissions committee has implemented a host of process innovations. During recruitment, the committee has de-emphasized parts of applications that have historically been included but have little to do with clinical acumen and instead have served as tools of exclusion. Furthermore, greater attention was paid to the relevant experience an applicant could bring to the residency program—community organizing skills, for example, or a passion for lobbying for change within government. The committee also communicated its goals of equity and inclusion to residency applicants and solicited their feedback, which is now being analyzed. As the demographics of incoming residents shift, the project PIs are focused on ensuring residents' success within the program, which "necessitates active efforts towards creating a culture of mentorship that is predicated on mutual respect and brings out the full healing capacity of every trainee," says Dr. Ekanadham. "Mentorship is key. We need to recognize what each resident has to offer. We have to pay attention to their driving passions, gifts, and skills and nurture them. Only then can we have hopes of retaining residents as faculty who will do the same for residents in the subsequent years to come."



“ROADMAP FOR ANTI-RACISM IN HEALTH CARE AND THE HEALTH SCIENCES”

The full report from the CUIMC Task Force for Addressing Structural Racism is available online at cuimc.columbia.edu/about-us/diversity-equity-and-inclusion-cuimc/report-cuimc-task-force-addressing-structural-racism.

A Space to Process Racial Trauma

Jean-Marie Alves-Bradford, MD, came to VP&S in 2000 as a postgraduate trainee in psychiatry and joined the faculty in 2004. Now an associate clinical professor of psychiatry and director of the Washington Heights Community Service, Dr. Alves-Bradford traces her leadership role in diversity, equity, and inclusion work at VP&S to 2012, when she joined the task force that would become the Department of Psychiatry's Faculty Affairs Committee of Diversity and Inclusion. Dr. Alves-Bradford served as co-chair for six years, and when Jeffrey A. Lieberman, MD, psychiatry chair, established the Office of Equity, Diversity & Inclusion to formalize the committee's work, he appointed Dr. Alves-Bradford its founding director. In that role she works with department leaders to create policies, programs, and opportunities that support an inclusive and equitable environment and serves as ombudsman for the department on issues related to equity, diversity, and inclusion.

With funds provided by the provost's office, Dr. Alves-Bradford has joined forces with Hetty Cunningham, MD, associate professor of pediatrics, and Hilda Hutcherson, MD, senior associate dean for diversity and multicultural affairs, to develop interactive workshops designed to foster healing and agency among medical students who have experienced racism. "It's already challenging to be a med student—you're learning a lot, changing a lot, and the hours and schedule are challenging, and then students who are underrepresented in medicine have additional challenges of dealing with racism and a system that doesn't always see them equally," says Dr. Alves-Bradford. "So we created spaces for them to have time to process and heal."

Through the workshops, participants learn about existing systems of privilege and oppression, share their personal experiences of racism, adopt effective practices for stopping acts of racism as they come up in daily life, and practice resilience strategies that will serve as tools to cope with racial trauma. The workshops, which began in March 2021, occur over two 90-minute Zoom sessions. Each workshop is co-facilitated by either two VP&S faculty members or a faculty member and a graduate student from Columbia's School of Social Work. The workshop content was created by Dr. Alves-Bradford and Dr. Cunningham with two 2021 VP&S graduates, Lauren Fields and Taiwo Alonge.

The first participants were medical students who identify as underrepresented in medicine—Black, Hispanic, and Native American. "We wanted to start with that group of students because they tend to experience more microaggressions," says Dr. Alves-Bradford. "We wanted to provide them with tools of how to respond and cope." Dr. Alves-Bradford received the Apgar Academy of Medical Educators' Vanneck-Bailey Award for 2021-2022



to create a longitudinal curriculum on bias response throughout all four years of medical school. The Provost Innovative Course Design Award will support development and implementation of a longitudinal curriculum of allyship, upstander, and advocacy skills for all medical students throughout their four years.

A Continuous Commitment

While Black, Latino, and Native American people comprise 33% of the U.S. population, they make up only 14% of the students entering medical school. As Dr. Lypson and her coauthors note in their *Academic Medicine* op-ed, people who experience racism have historically shouldered the bulk of the labor to bring about change. The work of anti-racism in health care, however, requires a collective commitment. “Each member of the academic medicine community should readily acknowledge that it is not only the system that must change but also the individuals who exist within it,” they wrote. “We must all develop new ways of thinking, seeing, and behaving to do our part to mitigate systemic racism.”

In that vein, many of the VP&S projects funded by the provost’s office invite white health care providers and medical students to confront the legacy of racism—with initiatives that target provider bias and advance health equity in maternal care, address inequities in liver transplant evaluation, design anti-racist case studies, and develop anti-racist policies to combat childhood obesity.

The provost’s office awarded only one year of funding, but many of the faculty expect to pursue other funding sources to sustain their efforts in years to come. In the meantime, they see this year’s awards as affirmation for work they have long crammed into evening and weekend hours. “Money is what speaks within this country,” says Dr. Ekanadham. “Financially appreciating this work on a level that we appreciate other type of projects and research is really important. By putting money towards it, institutions show what is important to them.” ❖

“Each member of the academic medicine community should readily acknowledge that it is not only the system that must change but also the individuals who exist within it.”



By Sharon Tregaskis

The Precipice of Change

Vice Dean for Education
Monica Lypton, MD, MHPE

When Rita Charon, MD, PhD, chair of the search committee named to identify a new vice dean for education at VP&S, started to look for candidates, one of the national education leaders she called upon to help was Monica Lypton, MD, MHPE, at George Washington University. When Dr. Lypton started talking with Dr. Charon, she was only interested in helping Dr. Charon identify exemplary candidates.

The more Dr. Lypton heard about the opportunity, though, the more intrigued she became. “It’s exciting to be part of a new conversation about what society needs in their physicians and what kind of physicians we should produce as a medical school,” says Dr. Lypton, who ultimately threw her own hat in the ring, “really wanting to be part of a place where medicine is changed through discovery, which is what Columbia is known for.”

In February, Dr. Lypton was named VP&S vice dean for education, a role she began June 1.

Most recently a professor of medicine, vice chair for faculty affairs, and director of the general internal medicine division at George Washington University, Dr. Lypton previously had oversight of and served as director of medical and dental education for the Department of Veterans Affairs. As a professor of medicine at the University of Michigan Medical School from 2001 to 2017, she also served as assistant dean for graduate medical education and interim associate dean of diversity and career development. She sees her appointment at Columbia as one that combines the four missions that guide academic medical centers: community, discovery, education, and patient care. “When we don’t bring all of that expertise to our medical students,” she says, “we do them a disservice.”

Dr. Lypton’s first order of business at Columbia will be to help faculty make explicit the implicit values that consistently make VP&S graduates top candidates in the National Resident Matching Program. “Everyone wants a Columbia graduate and

we need to articulate why—what is different, what makes us unique, what excites us.”

Among the strengths Dr. Lypton expects to hear echoed in that process are the opportunities VP&S students have to build their competency across domains and the synergy that results when they apply divergent perspectives. “Scientific, hypothesis-driven inquiry is an important skill set for our learners to have,” she says, noting the enormous benefits medical students realize from their proximity to the cutting-edge discovery constantly underway at Columbia. “And there are other ways of thinking and approaching a problem. Perhaps most importantly, Columbia is also known for being able to think about the problems of humanity, so students can assess their best approach when confronting problems of social importance.”

As medical educators across the United States grapple with the entrenched inequities of the nation’s health care system, Dr. Lypton sees validation for a perspective she has long championed in her own research and writing—from a 2002 Academic Medicine report on the declining diversity of faculty at American medical schools to her most recent commentary for the same journal on the pursuit of anti-racism in academic medicine. “It feels like we’re on the precipice of change,” says Dr. Lypton. “The tide feels consistent with my values.”

Other Education Leadership Changes

Jonathan Amiel, MD, who served as interim co-vice dean for education since January 2020, was appointed to a new role as senior associate dean for innovation in health professions education at VP&S. The new office he leads, the Office of Innovation in Health Professions Education, will integrate Columbia’s institutional resources in health care, business, law, journalism, and beyond to develop cutting-edge health professions education.

Lisa Mellman, MD, who also was interim co-vice dean for education following the retirement of Ron Drusin, MD, returned to her position as senior associate dean for student affairs. ♦



WE MUST
DO MORE:
**“COVID
ANYWHERE
IS COVID
EVERYWHERE”**

Pandemic
Preparation
Years in the
Making

By Kristin Bundy

Cumulative Confirmed Cases

Active Cases



3.024 deaths	Hubei Mainland
631 deaths	Italy
291 deaths	Iran (Islamic Republic of)
54 deaths	Republic of Korea
35 deaths	Spain
33 deaths	France
23 deaths	Washington
22 deaths	Henan Mainland
13 deaths	Heilongjiang
10 deaths	
100k	
80k	
60k	
40k	
20k	

Four years before the World Health Organization declared COVID-19 a pandemic, a small group of VP&S faculty members recognized the need for a program to address global health security. Their discussions led to an April 2017 seminar on Zika that illustrated a novel interdisciplinary approach—from clinical and public health aspects to policy, diplomacy, and journalism—that they believed should drive pandemic preparedness and response.

These collaborative efforts, which resulted in courses, lectures, research grants, and conferences, caught the attention of Pfizer's vaccine unit. Discussions with Pfizer began in 2019 and culminated by the end of the year in an educational grant to raise awareness of the critical role of vaccines in pandemic preparedness. The grant included plans to hold a symposium on the critical role of vaccines in global health security and the need for interdisciplinary solutions. Then COVID-19 became a household word.

“By March 2020,” says pediatrician and virologist Lawrence Stanberry, MD, PhD, one of the organizers of the planned symposium, “it was pretty clear the focus was going to be all COVID all the time.”

The Pivot

Addressing an outbreak of this scale in real time was a once-in-a-generation opportunity, says Dr. Stanberry, director of the Programs in Global Health at VP&S, which is why he and his co-chairs—Wilmot James, PhD, senior research scholar at Columbia's Institute for Social and Economic Research and Policy; Philip LaRussa, MD, pediatric infectious disease specialist and professor emeritus of pediatrics; and Marc Grodman, MD, physician-

entrepreneur, assistant professor of clinical medicine, and member of the Columbia University Irving Medical Center Board of Advisors—reimagined the entire symposium.

They intentionally avoided a narrow, nationalistic view. Global health security and worldwide response to the COVID-19 pandemic were of utmost importance to the faculty, especially given the accelerated frequency of outbreaks in recent decades—Ebola, H1N1, H5N1, Nipah, MERS, SARS-1, and Zika—amplified by travel, climate change, and deforestation and urbanization that have brought humans and wild animals in ever closer proximity.

The organizers also knew that most nations lack the funding and infrastructure to confront epidemics and protect the health of their citizens. Humankind was lucky that most of the previous epidemics fizzled out on their own, says Dr. Stanberry, but the COVID-19 pandemic was different.

The co-chairs built their new agenda around a roster of global experts: Anthony Fauci, MD, director of the National Institute of Allergy and Infectious Diseases; Tedros Ghebreyesus, PhD, director-general of the World Health Organization; Melinda French Gates of the Bill and Melinda Gates Foundation; Sir Jeremy Farrar, MBBS, director of the Wellcome Trust; Moncef Slaoui, PhD, former director of Operation Warp Speed; and Ezekiel Emanuel, MD, PhD, vice provost of global initiatives at the University of Pennsylvania, all of whom led the charge to formulate public health guidance, ramp-up research and development, furnish financial support, and advocate for social justice around COVID-19 and vaccines.

After confirming the keynote speakers, the organizers broadened their reach. They tapped experts in COVID-19 vaccine manufacturing, distribution, logistics, cost, access, bioethics, and equity from disciplines across Columbia University and around the world. At the symposium, speakers logged in from China, England, Ethiopia, South Africa, South Korea, Switzerland, and across the United States. “We made sure that we were diverse, and we made sure we were global,” says Dr. James.

Hosting a Vaccine Symposium During a Vaccine Rollout

After three years of planning—and nearly a year into the COVID-19 pandemic—the virtual online five-day “Vaccines and Global Health: COVID-19 Vaccine Development, Strategy and Implementation” kicked off in late February 2021. Thousands gathered online for daily two- to three-hour livestream sessions, with additional viewers accessing the archived recordings on the symposium's website.

Already, South Africa, the United States, the United Kingdom, and parts of the European Union had begun their vaccine rollouts (albeit at different rates). The vast majority of nations, however, awaited aid.

“Unless we end the pandemic everywhere, we will not end it anywhere,” urged WHO Director-General Dr. Ghebreyesus on the first day of the symposium. “This is not a matter of charity; it is a matter of epidemiology.” Wealthy nations will not be safeguarded



U.S. NAVY / IST CLASS PRESTON KERES



Lawrence Stanberry, Wilmot James, Philip LaRussa, and Marc Grodman

JÖRG MEYER

by their own vaccination efforts while the virus continues to circulate the globe and mutate among populations who cannot afford to vaccinate their people.

Health inequities and global safety were common themes woven through every talk. Each expert called on governments, philanthropies, and industry to step up their commitment to help secure full-scale global vaccination. It was already apparent by late February 2021 that wealthier nations had the advantage in early vaccination efforts: 210 million doses had been administered, noted Dr. Ghebreyesus, and just two countries received half of those doses. Ten countries received more than 80% of the doses.

Economic factors remain the top impediment to the kind of fast, affordable vaccine development, production, and worldwide distribution required to contain a global pandemic. Funding, research, technology, manufacturing, distribution, and sales are centered in countries with high gross domestic product—leaving less-wealthy nations, and whole continents like Africa and South America, without access to intellectual property rights and the infrastructure necessary to manufacture and distribute their own vaccines. This puts less-privileged countries in the position of having to rely on the goodwill of wealthy nations to donate vaccines.

These inequities, noted Dr. Fauci during the symposium, make everyone vulnerable. “The best way to have sustainable capability

Global public health considerations should outweigh the imperative for corporations and shareholders to maximize their profits in the midst of a raging global pandemic.

of being able to respond to outbreaks—not only the outbreak of COVID-19, but also the inevitable outbreaks that will occur in the future—is to build capacity within country.” Given the right resources, more nations would be capable of making vaccines to care for their own populations.

Leaders also encouraged vaccine manufacturers and academic laboratories to share intellectual property and transfer technology to widen global access to vaccines. Doing so, said WHO Chief Scientist Soumya Swaminathan, MD, would give manufacturing sites around the world the capability to produce vaccines for outbreaks at a moment’s notice.

Even months after the symposium concluded, politicians around the world—and the event organizers themselves—continue to grapple with such thorny questions as how to balance global vaccine

production and distribution with the financial imperatives of for-profit manufacturing and distribution chains. “Intellectual property issues are important to protect the investment of companies and their shareholders,” says Dr. James. “I understand why companies are protective.” But, he adds, global public health considerations should outweigh the imperative for corporations and shareholders to maximize their profits in the midst of a raging global pandemic. “Because we’re dealing with an emergency, returns to shareholders have to be reduced to the minimum. We have to see the willingness on the part of companies to provide expertise and other kinds of assistance, and we need to make sure that new financial instruments are introduced to subsidize supply to countries who can’t afford it.”

Vaccine nationalism—when wealthy nations prioritize access to scarce vaccines for their own citizens before weighing global health considerations—threatens to extend the pandemic, he says. “We’ve got a choke on development; there is not enough

supply. There’s some hoarding going on, and I think countries with resources in the Northern Hemisphere, who obviously have obligations towards their citizens, need to find a better balance between taking care of citizens and taking care of the world. We need to pivot towards a global effort.”

COVAX and Future Prospects for Global Vaccination

On Feb. 19, the Friday before Columbia’s vaccine symposium, the Group of 7, or G7, countries committed \$4.36 billion to support a more equitable distribution of vaccines, diagnostics, and therapeutics for COVID-19 to low- and middle-income countries through COVAX, a global program jointly run by GAVI, CEPI, WHO, and UNICEF. The United States pledged \$4 billion to COVAX over two years.

With investments from wealthier nations, COVAX had distributed 208 million doses to 138 partners in Africa, Central and

THE VIROLOGIST WHO WENT VIRAL

Before the era of podcasts, Vincent Racaniello, PhD, filled his long commute with audioblogs. As the technology advanced, the Higgins Professor of Microbiology & Immunology was inspired while listening to a podcast called “This Week in Tech”: “I need to do this for virology.”

He pitched the idea to his colleague, Dickson Despommier, PhD, now retired, and they released their first podcast, “This Week in Virology,” in September 2008. “We have our usual conversation that we have every day at work—which nobody hears, but is quite interesting—and record it.” As more people tuned in, Dr. Racaniello brought on more cohorts.



Vincent Racaniello, right, with Dickson Despommier

JÖRG MEYER

“We get into the science in a deep way that nobody else does, not too quickly or dumbed down.”

By the end of 2019, Dr. Racaniello had hosted over 500 episodes of TWiV, with a total of 6 million downloads.

Then came COVID-19.

TWiV’s audience-base exploded as the public sought information about SARS-CoV-2. Dr. Racaniello started recording three episodes per week—nearly all of

them devoted to the pandemic—and by the end of 2020, TWiV had another 6 million downloads. “As many as we had in all previous 11 years,” says Dr. Racaniello.

He also hosts six other podcasts and a weekly livestreamed lecture on virology, which he posts to YouTube for more than 85 million subscribers.

“Science is proceeding at such a fast pace,” Dr. Racaniello says. “This is our moment to help people understand it.”



South America, the Middle East, Eastern Europe, Southeast Asia, and Western Pacific Island countries by mid-August 2021.

The continuous drumbeat of the meeting was this: We must do more. “COVID anywhere is COVID everywhere,” said Melinda French Gates, commenting on global equitable access to vaccines. “If we’re going to have a full economic recovery, we have to get COVID cleaned up all over the world. It’s both the right moral thing to do, and it’s the right economic thing to do.”

Getting Ready for the Next Pandemic

This year’s vaccine symposium was the largest virtual symposium ever hosted by Columbia. Promotional efforts from the university’s global centers brought more than 3,600 attendees from around the world—public health specialists, health care professionals, heads of health-related nongovernmental organizations, and medical and public health journalists. On social media, the total livestream views neared 85,000.

Drawing together thousands to share ideas on an urgent need in global health security was meaningful to Dr. Stanberry, but he was equally moved by the participating speakers’ universal inclusion of medical ethics and issues of humanism in global decision-making and a collective emphasis on “doing something just because it’s the right thing to do.”

Dr. James was struck by the deep desire of people to listen across disciplines. “Medical scientists and public health scientists really wanted to hear from the social science community, the bioethics

“We need capable leaders who don’t kick the can down the road. We need presidents and prime ministers to mobilize the rapid response. It has to come from the highest office of the land.”

community, and individuals from the corporate community to essentially break out of their silos and open up a conversation.”

Dr. James says he also was pleased that Columbia could create a moment that symbolized for the world that WHO and the U.S. government are working together to deal with the pandemic, a sentiment that was solidified just one month before the symposium when the Biden administration took office.

Looking Ahead

What are some of the lessons learned during the COVID-19 pandemic that will help us get ready for the next one?

In general, says Dr. James, three areas of improvements are needed globally. One is prevention. “Very few countries are willing to borrow money to prevent something that may or may not hap-

pen.” In lieu of robust prevention measures, broader outbreak surveillance and more resilient health systems are needed. The second needed improvement is increasing the number of countries that have rapid response capabilities, including better technology and trained emergency and health care workers. And the third is better detection, using new instruments and more sophisticated diagnostics.

He adds a fourth: “Most of all, we need capable leaders who don’t kick the can down the road. We need presidents and prime ministers to mobilize the rapid response. It has to come from the highest office of the land.”

The journal *Vaccine* will publish a paper authored by the four co-chairs. “The goal of the report is to summarize the diverse perspectives shared at the meeting and provide a comprehensive overview of the most important scientific, financial, logistical, ethical, and public health issues at that point in time,” says Dr. Stanberry. “We anticipate that the report will serve as a useful baseline for researchers as they track progress in addressing the wide-ranging issues discussed at the symposium and act as a historical document of the pandemic one year in.”

The work will not stop there. The co-chairs plan to host follow-up events to assess the world’s progress and determine what is needed next.

“I’m curious where we’ll be in six months,” says Dr. Stanberry. “We should have more data on vaccine durability and protection, and we may be able to answer questions like *What proportion of the world has been immunized? Will we need vaccine boosters? What is the update on cost and things of that nature?*”

Dr. James goes bigger. His dream is to start changing systems to better fit current needs. “We need to tackle climate change because this is not unrelated to epidemic outbreaks,” he says. “And my aspiration is for us to take a global approach to sorting out these problems because they are global problems. We need to develop more effective global institutions to take that vision further. Right now, we have global institutions that were designed in the 19th and 20th centuries. I would like us to find a better design for the new global order.” ❖



HELP FROM OUR FRIENDS



JENNIFER O'ROURKE

A Year of Significant Challenges—and Significant Support to Match

In the face of the greatest public health threat in more than a century, our faculty and staff lived up to and even exceeded the highest ideals of VP&S: service, compassion, and healing. Our friends and partners matched the efforts of our doctors, scientists, and trainees with generous philanthropy. While our work and gatherings were more virtual than any of us ever would have imagined, the spirit of extraordinary generosity endured. Together, we have been able to make significant progress not just against COVID-19, but also in support of endeavors across our medical school.

We found creative ways to nurture and expand our communities through online programming. The dedicated efforts of our volunteers and benefactors ensured that annual events so important to our success—Crown Awards, Babies Heart Fund Gala, Children's Health Gala, and others—sustained their momentum to support our work.

Building upon a foundation built by Roy and Diana Vagelos and numerous alumni and friends, we continue to deepen our pledge to make a top-tier medical education accessible and innovative through our precision medicine initiative and our loan-free scholarship program. Our scholarship initiative enables VP&S students to graduate unburdened by medical school debt, pursuing careers in medicine they are most

passionate about. Our institutional commitment to diversity, equity, and inclusion guides every mission—making us better educators, better scientists, better doctors, better neighbors. Our researchers continue to make significant progress, guided particularly by the new tools and insights made possible by the university-wide initiative in precision medicine, to use a patient's own genetic information to inform individualized care. Despite unprecedented conditions, our commitment to medicine and science remains unchanged and, understandably, has been reinforced.

We also continue to expand upon the generosity of the late Herbert and Florence Irving by making our commitment to cancer felt across our campus and throughout the field of oncology. In addition, we remain focused on initiatives to fight neurodegenerative illnesses, cardiac ailments, and pediatric diseases through work in every department and division.

The generosity of our friends and supporters makes our work possible. We are thankful and humbled, and we face each new year with hopefulness and gratitude as a result of the outpouring of support from the previous year. Some of the gifts that support our missions are described on these pages, but we regard each gift, no matter the size, as an opportunity to shape—and even change—the future of medicine.



Jennifer Ashton '00



Brian Stokes Mitchell

Crown Awards: Celebrating Front-Line Heroes

In November 2020, the 11th annual Crown Awards celebrated the contributions of front-line health care heroes, whose dedication, empathy, and skills allowed them to respond valiantly to the COVID-19 pandemic. Jennifer Ashton, a VP&S graduate and ABC News chief health and medical correspondent, emceed the event, which featured a tribute to VP&S Dean Emeritus Lee Goldman, remarks from Roy and Diana Vagelos, and a performance by two-time Tony Award winner Brian Stokes Mitchell.

Babies Heart Fund Gala

The annual Babies Heart Fund Gala, which supports the work of the Division of Pediatric Cardiology, was held online this year and featured a virtual balloon raise and celebration to raise crucial funds to support pediatric cardiac surgery and pediatric cardiology at Columbia. Emceed by CNBC host Jim Cramer and led by Babies Heart Fund gala chair Patricia Grayson, the evening featured Jordan Orange, MD, PhD, chair of the Department of Pediatrics, and Christopher Petit, MD, the new pediatric cardiology division chief. The event highlighted the impact of the work of cardiologists and cardiac surgeons on the children and families in their care.



Jim Cramer

Columbia Children's Virtual Benefit



Daphne Oz



Jill Kargman

Although held online, the annual gala to support Columbia Children's Health provided an opportunity to connect even during the pandemic and highlighted the accomplishments of the Columbia Center for Children's Digital Health Research. Under the leadership of its director, Melissa S. Stockwell, MD, MPH, the Center for Children's Digital Health Research works at the intersection of technology and health care, the importance of which was emphasized during the pandemic. The event, chaired by Ben and Sarah Sealaus and Brad and Alfredo Paredes-Goldfarb, and hosted by Jordan Orange, MD, PhD, chair of the Department of Pediatrics, featured a discussion between Emmy Award-winning television host Daphne Oz and Jill Kargman, New York Times bestselling author and star of "Odd Mom Out."

Velocity

In its fourth year, Velocity: Columbia's Ride to End Cancer expanded its reach by creating a virtual community to help support patient care and the work of pioneering researchers at the Herbert Irving Comprehensive Cancer Center. Giving participants the option to engage in activities of their choosing resulted in an outpouring of support. From riding outdoors and indoor cycling to walking, running, hiking, and even dancing, the community came out in force to support cancer care and research programs. A matching gift challenge again offered by the Crimson Lion/Lavine Family Foundation also helped Velocity participants double their impact. Velocity raised more than \$1.1 million.





Diana and Roy Vagelos

Roy and Diana Vagelos

Dr. Roy and Diana Vagelos have continued their legacy of philanthropy at VP&S. In 2021, they expanded their support for student scholarships with a gift of \$7 million to endow the Roy and Diana Vagelos Merit Scholarship Fund to provide additional financial support to medical students. Dr. and Mrs. Vagelos also gave \$1 million to establish the Roy and Diana Vagelos Student Clinics Fund. The fund will support the operations of student-run clinics at VP&S in perpetuity. In addition to providing an important educational opportunity for medical students, the clinics offer critical health services to underserved groups throughout New York City. Dr. and Mrs. Vagelos also extended their support for the Precision Medicine Initiative with funding for a newborn genomic screening research project. A pilot program led by Wendy Chung, MD, PhD, the Kennedy Family Professor of Pediatrics in Medicine, the project will help sequence the genomes of newborns, screen for genetic diseases, and conduct research on the genetic basis of disease. This pilot funding will leverage additional support from other friends and donors. Dr. and Mrs. Vagelos also committed \$300,000 for the CUIMC Validation Fund, a new initiative to provide startup funding to VP&S faculty with the goal of moving promising research projects toward commercialization.

Cohen Center for Health and Recovery from Tick-Borne Diseases

With extraordinarily generous gifts totaling \$16 million, the Steven & Alexandra Cohen Foundation funded the establishment of the Cohen Center for Health and Recovery from Tick-Borne Diseases, which provides specialized care for patients with Lyme disease and similar diagnoses. The foundation also is funding a national clinical trials network to identify more effective treatments for patients with Lyme and tick-borne diseases.

“We know firsthand the devastation that Lyme and tick-borne diseases can cause, and we are thrilled to support this innovative center and clinical trials network to help bring treatments and hope to patients and their families,” says Alex Cohen, president of the Steven & Alexandra Cohen Foundation.

The Cohen Center will extend Columbia’s clinical care in Lyme disease; expand research in clinical trials, brain imaging studies, and neuropsychiatric studies; and provide training for family medicine fellows and medical students on

how to evaluate and treat patients with tick-borne diseases.

“Like COVID-19 ‘long-haulers,’ many people with tick-borne diseases were completely well until their infection precipitated a cascade of chronic, multisystem effects,” says Brian Fallon, MD, director of the Cohen Center for Health and Recovery from Tick-Borne Diseases. “A comprehensive evaluation takes time. In addition, the cost of care for patients with chronic symptoms can be prohibitive, requiring multiple visits to physicians who may not be aware of the latest research on tick-borne illnesses. Our center will be the first to address all of these issues by offering access to affordable care with experienced physicians while at the same time integrating research and physician training into our clinical model.”

Robert L. Burch III

Robert L. Burch III, a longtime donor and partner to VP&S, made major gifts to the Department of Ophthalmology this year. With a commitment of \$3.5 million, the Burch Family Foundation reinforced the Chang-Burch Scholars Fund, which identifies, recruits, and helps retain promising young physician-scientists in the department. The gift supports two groups of three scholars, each for a period of three years, as the investigators establish research programs that will make them eligible for grants from more traditional funding sources, such as the National Institutes of Health. The Burch Family Foundation also made a gift of \$500,000 for general operations in the Department of Ophthalmology.

Henry and Marilyn Taub Foundation

The Henry and Marilyn Taub Foundation gave \$5,000,000 to the Taub Institute for Research on Alzheimer’s Disease and the Aging Brain to support the Taub Institute Grants for Emerging Research

program. The program provides research funding for pilot projects that focus on the neurobiology of aging and dementias, including Alzheimer's disease. With the five-year gift from the Henry and Marilyn Taub Foundation, Columbia investigators will receive seed grants for their research in the area of dementia. The grants will range from \$50,000 for one year to \$200,000 a year for two years.

John and Myrna Daniels Foundation

With a gift of \$2.5 million, the John and Myrna Daniels Foundation has established a professorship in the Department of Psychiatry to honor Herbert Pardes, MD. The inaugural John and Myrna Daniels Professor of Psychiatry in Honor of Dr. Herbert Pardes is Bret Rutherford, MD. Dr. Rutherford and faculty members who later hold the professorship will work on research, education, and patient care related to mental health and neuropsychiatric illness in older adults.

Dr. Pardes, a psychiatrist by training, has made significant contributions to the field of mental health as an administrator, humanist, pioneer, and champion of innovative research. His legacy includes contributions in education, prevention, research, health policy, administration, clinical care, mentoring, and advocacy. Dr. Pardes is executive vice chairman of the Board of Trustees of NewYork-Presbyterian and holds a faculty position in Columbia's Department of Psychiatry. His career included terms as director of the New York State Psychiatric Institute, dean of Columbia's medical school, and president and CEO of NewYork-Presbyterian.

Alixé Gordin

Alixé Gordin included a bequest in her will to honor the late Georgiana M. Jagiello, MD. Dr. Jagiello was a member of the Columbia team responsible for one of the first in vitro fertilization births

in New York City. Ms. Gordin's gift will provide scholarships for VP&S to continue Dr. Jagiello's legacy in the field of genetics.

Morgan Stanley

As part of the Morgan Stanley Alliance for Children's Mental Health, Morgan Stanley made a \$1.3 million gift to the Department of Psychiatry to fund research to better understand and address the impact of the COVID-19 pandemic on children's mental health. This work focuses on vulnerable communities that traditionally lack access to care. The research includes the impact of COVID-19 and use of digital technology on the mental health of Latinx youth, the use of innovative technology to assess adolescent depression, and the impact of telehealth treatment. The research findings are expected to inform intervention, improve access to care, and foster social equality.

Frederick Iseman

Frederick Iseman's gift of \$1,250,000 to the Department of Medicine will establish the Frederick J. Iseman Advanced Pulmonary Research Fellowship, which will recognize and support fourth- and fifth-year fellows committed to advancing care and research in pulmonary medicine.

Susan S. Mirza

Susan S. Mirza has continued her long-standing support to honor her late husband, Muzzafar "Muzzi" Mirza, with a new gift of \$1,000,000 to support the Pancreas Center in the Department of Surgery. Her commitment will support the center's new five-year \$10,000,000 Hope Ahead Campaign. Executive director of the center is John Chabot, MD, the David V. Habib Professor of Surgery at VP&S and chief of GI/endocrine surgery at NewYork-Presbyterian.

Royalty Pharma

Biopharmaceutical company Royalty Pharma made a \$1 million gift to the Department of Medicine to support three COVID-related studies. The first tracks COVID-19 seroprevalence among health care workers and identifies patterns in exposure and risks of illness plus identifies the factors that contribute to mental and physical well-being over the duration of the study. The second project looks at cellular responses and the durability of immune responses to COVID vaccines. The third studies the response to COVID vaccines in Latino/Hispanic and Black communities. Led by founder and CEO Pablo Legorreta, Royalty Pharma has a tradition of innovation, and this gift supports research that is comprehensive, inclusive, and futuristic.

Andrew Sabin Family Foundation

The Andrew Sabin Family Foundation gave \$2,500,000 to the Department of Surgery to establish the Andrew Sabin Family Foundation Cardiovascular Laboratory Fund that supports cardiac research.

The Andrew Sabin Family Foundation also gave \$2,500,000 to the Department of Urology to establish the Men's Health Program Fund, which supports men's health research, treatment, and education. The fund also will support the Andrew Sabin Family Foundation Assistant/Associate Professorship Fund to allow the holder of the professorship to devote more time to research.

John and Wendy Havens

John and Wendy Havens gave a donation to the Columbia University Fertility Center and the Department of Obstetrics & Gynecology to establish the Havens Innovators Fund to support a vertically integrated clinical and research program to rapidly develop significant innovations that improve the health of women and children. The program will be led by Zev Williams, MD, PhD.

VP&S Research Highlights

Living Joint Grafts Bioengineered

In a report published in *Science Translational Medicine*, a team led by Gordana Vunjak-Novakovic, PhD, details how anatomically precise living grafts for personalized replacement of a jaw joint were bioengineered using the recipient's fat-derived cells. The team demonstrated the effectiveness of the bioengineering in a clinically sized swine model. For the millions of Americans who suffer from TMJ dysfunction due to birth defects, trauma, or disease, the findings could be transformative, says Dr. Vunjak-Novakovic. "We believe that this methodology could be extended to bioengineering other joints and to establishing high-fidelity models for studying joint diseases."

Molecules in Motion

A team that included Nobel laureate Joachim Frank, PhD, has devised a technique to produce videos of molecules in motion. The technique exploits the way molecules wiggle randomly in solution before they are flash-frozen for cryo-electron microscopy. Data analysis using machine learning can uncover the important molecular motions from random snapshots captured by the electron microscope. By combining information from 800,000 images of the ryanodine receptor with and without activating molecules present, the team documented the functional pathway between closed and open receptors for the first time. The work, which may help in the development of

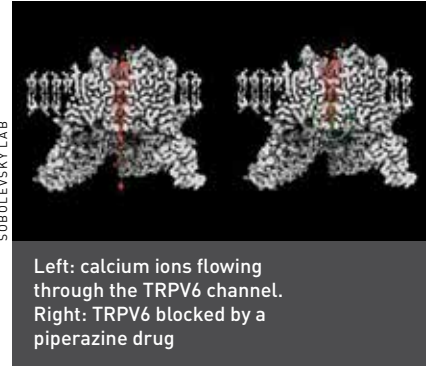
new drugs for heart failure and other diseases, was published in *Nature Communications*.

New Genetic Risk Factors for Alzheimer's

Researchers once thought that genes linked to Alzheimer's in whites could be extrapolated to other groups, says Christiane Reitz, MD, PhD. But genetic variations in the disease from group to group show that genome-wide association studies need to be more inclusive. She led the largest genome-wide association study of genetic factors that raise the risk of Alzheimer's in Blacks. The study, published in *JAMA Neurology*, identified several new genetic risk factors and a possible new disease pathway related to kidney function, suggesting a novel mechanism for Alzheimer's.

Novel Drugs to Halt Aggressive Cancers

Researchers have developed a novel class of drugs that block TRPV6, a calcium channel that plays a key role in the growth of many cancers. Increased expression of TRPV6 leads to abnormally high levels of intracellular calcium, which in turn drive cell proliferation in some of the most dangerous cancers. The regulatory protein calmodulin prevents calcium overload by blocking the TRPV6 channel opening when it detects excess levels of calcium. A team led by Alexander I. Sobolevsky, PhD, designed, synthesized, and characterized a new class of drugs that bind to the same region inside the



SOBOLEVSKY LAB

Left: calcium ions flowing through the TRPV6 channel. Right: TRPV6 blocked by a piperazine drug

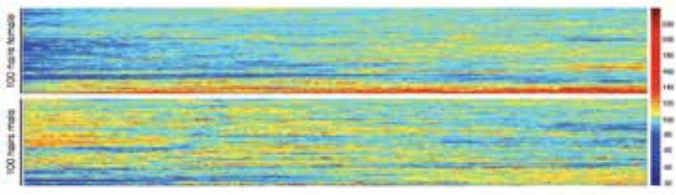
channel as calmodulin and therefore mimic its protective action. The study was published in *Science Advances*.

Potential Weight Loss Treatment

A hormone that can suppress food intake in mice showed similar results in humans and non-human primates in a series of studies published in *eLife*. The researchers, including Stavroula Kousteni, PhD, analyzed data from four studies of people who were given a meal after an overnight fast. They found that, on average, levels of the hormone lipocalin-2 (LCN2) increased after the meal, which coincided with how satisfied the participants felt after eating. However, in people who are overweight or obese, LCN2 levels decreased after a meal. People who had lost weight after gastric bypass surgery were found to have a restored sensitivity to LCN2. When the team treated non-human primates with LCN2, monkeys in the study ate 21% less than their counterparts who were treated only with saline, and they showed a decline in body weight, body fat, and blood fat levels.

Stress and Gray Hair

Researchers linked psychological stress to graying hair in people and found that hair color can be restored when stress wanes. "Human aging is not a linear, fixed biological process but may, at least in part, be halted or even temporarily reversed," says Martin Picard, PhD. The researchers analyzed individual hairs from 14 volunteers. The results were compared with volunteers' weekly ratings of stress levels. Changes in 300 proteins occurred when hair color changed, and the researchers developed a mathematical model that suggests stress-induced changes in mitochondria may explain how stress turns hair gray. The study was published in *eLife*.



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Hair pigmentation patterns of 100 hairs from two study participants (top from a female, bottom from a male). Darker hair colors represented in red, lighter in blue.

Protecting Proteins to Treat Disease

A team led by Henry Colecraft, PhD, has created a technology using synthetic llama antibodies to prevent specific proteins from being destroyed inside cells. The approach could be used to treat dozens of diseases, including cystic fibrosis, that arise from the destruction of imperfect—but still perfectly functional—proteins. In many genetic diseases, such mutated proteins are tagged for destruction by the cell's quality control mechanisms. In a paper in *Nature Methods*, Dr. Colecraft's team described how they combined a synthetic nanobody that recognizes a specific protein with an enzyme that can rescue proteins tagged for destruction. They tested the efficacy of their approach by rescuing a protein mutated

in cystic fibrosis and another mutated in long QT syndrome.

Big Data Finds Cancer's Weak Links

Thousands of genetic mutations have been implicated in cancer, but a new analysis of almost 10,000 patients found that regardless of the cancer's origin, tumors could be stratified in only 112 subtypes and that, within each subtype, the master regulator proteins that control the cancer's transcriptional state were virtually identical, independent of the specific genetic mutations of each patient. The study, published in *Cell*, suggests that a much larger fraction of patients may respond to novel drug classes designed to target master regulator proteins, in contrast with approaches that seek drugs targeting mutated genes associated with increas-

ingly smaller patient subsets. The analysis, which has the potential to streamline and improve cancer treatment, was led by Andrea Califano, Dr; Cory Abate-Shen, PhD; and Mariano Alvarez, PhD.

Why Immune Checkpoint Meds Fail

Immune checkpoint inhibitors release the brakes that prevent the immune system from operating at full power when it encounters cancer cells. Among a third of patients with metastatic melanoma, such drugs have near curative effects. A study published in *Nature Genetics* unravels why immune checkpoint therapy fails the other two-thirds of patients. Benjamin Izar, MD, PhD, and collaborators previously implicated 250 genes in immunotherapy-resistant metastatic melanoma. Researchers combined CRISPR, single-cell RNA and -protein sequencing, and computational biology tools to reveal how those genes alter cellular processes to evade immunotherapy.

Genes Behind Rare Eye Disease

Rando Allikmets, PhD, identified gene variants that cause a metabolic deficiency in the eye called macular telangiectasia type 2 (MacTel), which slowly causes a significant loss of central vision. In previous studies, Dr. Allikmets had linked MacTel with general serine deficiency and with genes involved in sphingolipid biosynthesis. The researchers for new studies used a method called collapsing analysis to pinpoint genes responsible for serine biosynthesis. The work, implicating defects in the key serine biosynthesis enzyme PHGDH in a significant fraction of MacTel, was published in *Nature Metabolism*

and *Science Translational Medicine* and solidifies and specifies the link between MacTel and serine deficiency.

Genetics and OCD

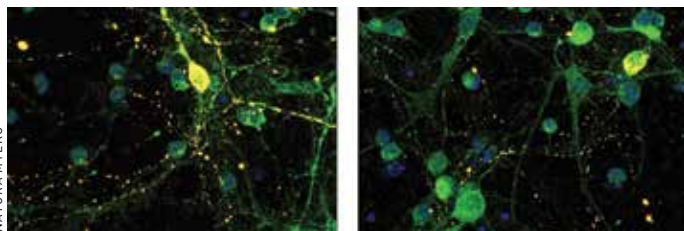
In the first analysis of its kind, researchers used whole exome sequencing to identify distinct patterns of genetic mutations among people with obsessive-compulsive disorder. The work, published in *Nature Neuroscience*, confirms the validity of targeting specific genes to develop new OCD treatments and points toward novel avenues for studying this often-debilitating condition. OCD often runs in families, but OCD genes remain unknown. "Many neurological diseases are influenced by strongly acting mutations which can cause disease by themselves," says David Goldstein, PhD. "These mutations are individually very rare but important to find because they can provide a starting point for the development of therapeutics that target precise underlying causes of disease. This work shows a similar paradigm applies to OCD."

New Insight into Metastatic Cancer

Two studies led by Anil Rustgi, MD, reveal clues for understanding metastatic cancer and potentially applying translational therapeutic strategies. In a study of pancreatic cancer published in *Cancer Discovery*, Dr. Rustgi and his group found that lowering levels of a protein called PTHrP can prevent metastases and improve survival in mice. Results of their experiments with human pancreatic cells were also encouraging: Anti-PTHrP antibodies greatly reduced growth and viability of the cells. Genes

Alzheimer's and Toxic Tau

A new idea for treating Alzheimer's disease could eradicate the toxic proteins most closely linked to cognitive decline in the places where the proteins do the most damage, suggests a study by Natura Myeku, PhD, in *Science Translational Medicine*. Early in Alzheimer's disease, toxic tau proteins accumulate inside the brain's synapses, impeding the transmission of signals from one neuron to another. Dr. Myeku's team found that the most toxic tau proteins accumulate predominantly on one side of the synapse. A peptide that stimulates PAC1 receptors, which are largely found on the same side of the synapse as tau, reduced toxic tau levels and improved cognitive performance in mice with early-stage tau accumulation, without affecting proteasomes in other parts of the brain.



A peptide that stimulates receptors in neurons reduced the amount of toxic tau proteins present. Tau proteins are labeled yellow. Left image shows untreated neurons; right image shows neurons treated with the peptide.

NATURA MYEKU

and Development published Dr. Rustgi's group's elucidation of the role of the BIRC-5 gene and Survivin, the protein it encodes, in lung metastasis of esophageal squamous cell carcinoma and the potential role of BIRC-5 and Survivin in other Survivin-dependent cancers, such as pancreatic cancer and colorectal cancer. Work continues to take this knowledge into clinical trials.

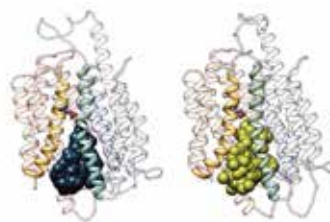
Research Funding: VP&S at No. 5

VP&S reached its highest ranking ever by ranking No. 5 among medical schools in National

Institutes of Health funding for the federal fiscal year that ended Sept. 30, 2020. VP&S received \$496 million in NIH funding, enabling its jump from No. 9 in FFY19. Since FFY09, VP&S has moved from No. 14 to No. 5, the largest increase among the top 10 medical schools.

Crossing the Blood-Brain Barrier

Images of MFSD2A, a transporter molecule that shuttles omega-3 fatty acids into the brain, may open the door to delivering neurological therapeutics to the brain. "The trans-



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Models of MFSD2A show how the molecule transports omega-3s and other lipids into the brain. Here, snapshots of MFSD2A show two lipids—LPC 18:3 (left) and omega-3 (right)—inside the transporter's intracellular cavity.

porters are like bouncers at a club, only letting molecules with invites or backstage passes in," says Rosemary J. Cater, PhD, who, along with Filippo Mancina, PhD, used single-particle cryo-electron microscopy to visualize MFSD2A. The blood-brain barrier blocks toxins, pathogens, some nutrients, and many drugs that are otherwise promising candidates to treat neurological disorders. Their work was published in Nature.

Institute Renewals

Columbia received \$61.7 million from the NIH to continue support of the **Irving Institute for Clinical and Translational Research**. The funding supports high-quality translational science and clinical research and fosters innovation in research methods, training, and career development. The renewal of funding acknowledges the Institute's achievements over the past five years; this year's application for renewal of funding received a perfect overall score from the NIH's review committee. The **Herbert Irving Comprehensive Cancer Center** also was competitively renewed as a designated comprehensive cancer center by the National Cancer Institute. Originally funded in 1972, the HICCC gained

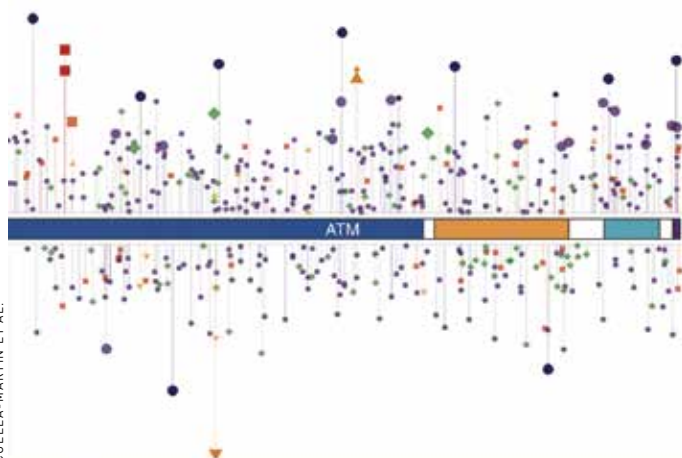
comprehensive status, the highest ranking given, in 1979. The current redesignation comes with a five-year support grant of \$26.5 million—an increase of nearly 40% in funding over the previous support grant.

Cancers and Ancient Viral DNA

A team led by Adam Bass, MD, has found that many esophageal cancers turn on ancient viral DNA that was embedded in our genome hundreds of millions of years ago. Known as endogenous retroviral elements, or ERVs, these viral fossils in DNA may disrupt gene function or act as switches that turn on cancer-causing genes; in RNA, they cause double-stranded RNA. Dr. Bass's team created esophageal organoids from mouse tissue to follow the development of cancer from normal cells to malignancy, finding that SOX2, a cancer-promoting gene in esophageal cancers, leads to induction of expression of many ERVs. They also found that the enzyme ADAR1 quickly degrades these double-stranded RNAs, which can be toxic to cells. They hypothesize that blocking ADAR1, whose presence is associated with poor prognosis in esophageal cancer, could precisely target the cancer cell. Nature Genetics published the report.

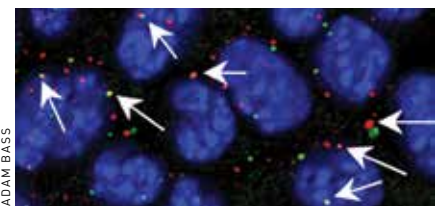
CRISPR: How Changes to Genes Affect Disease

A paper in Cell describes a new method that uses the genomic editing system known as CRISPR to simultaneously make thousands of point mutations in human genes. The method will help researchers understand how subtle changes to genes contribute to cancer and other diseases. A team led by Alberto Ciccia, PhD, devised the CRISPR-based tool to study genes involved in DNA repair, but the method could be applied to the study of any type of gene. Researchers trying to understand a gene's effect on disease have generally been limited to making changes that disable an entire gene and its respective protein. This new type of gene editing—called CRISPR-dependent cytosine base editing—will accelerate the discovery and analysis of clinically important mutations and could lead to precision medicines tailored to a patient's exact genetic abnormality.



QUELLA-MARTIN ET AL.

Using base editors to make individual point mutations inside a gene, researchers can evaluate how each mutation alters cell behavior. The graphic illustrates how cells carrying a mutation in the ATM gene respond to a drug used to treat advanced ovarian cancer.



ADAM BASS

Esophageal cancers resurrect bits of ancient retroviruses, ERVs, embedded in our genome. Green dots mark expression of ERVs. Red dots mark a protein called ADAR1 that the cancer uses to degrade the ERVs.

VP&S Clinical Highlights

Preventing Heart Disease in the Elderly

Therapies that soothe inflammation could be an effective way to prevent heart disease in people with clonal hematopoiesis, a common age-related blood condition. The condition worsens atherosclerosis, but an anti-inflammatory drug previously tested in a population of people with cardiovascular disease may have potential if used only in those with clonal hematopoiesis. Clonal hematopoiesis is thought to occur in roughly 10% of people over age 70. Most people have no symptoms, but the condition raises the risk of heart disease by 40%. The research published in *Nature* was led by Alan Tall, MD, and Nan Wang, MD.

Risk for PTSD After Life-Threatening Events

Faculty used supervised machine learning to develop an algorithm that can predict whether survivors of traumatic events are likely to develop post-traumatic stress disorder. The tool relies on routinely collectable medical data and could allow clinicians to intervene early to mitigate the effects of PTSD, particularly in patients treated in emergency departments after car accidents, falls, gunshot wounds, assaults, and other potentially life-threatening events. Katharina Schultebrucks, PhD, was lead author of the research published in *Nature Medicine*. Health experts estimate that 10% to 15% of trauma patients will develop long-lasting PTSD

symptoms, usually within a year of their trauma event. Potential treatments are available to reduce the risk for developing PTSD, but early prevention strategies are typically not implemented because of the lack of established methods that can predict which patients are most likely to develop PTSD. The researchers combined 70 clinical data points that often precede PTSD in trauma survivors, including elevated stress hormones, increased inflammatory markers, and high blood pressure, to compute a single PTSD Risk Score. The goal after more testing and validation is to incorporate the tool into electronic health records to provide ED clinicians with an accurate and reliable clinical readout at the point-of-care.

Recovering Damaged Human Lungs

Gordana Vunjak-Novakovic, PhD, and colleagues in Columbia Engineering and Vanderbilt University demonstrated that human lungs rejected for transplant can be recovered using cross-circulation of whole blood between a donor lung and an animal host. The multidisciplinary team took human lungs that had been rejected for transplantation after they failed to recover using the standard *ex vivo* lung perfusion method that assesses marginal quality donor lungs. The team was able to successfully recover the rejected lungs during 24 hours on the team's cross-circulation platform. The team has spent

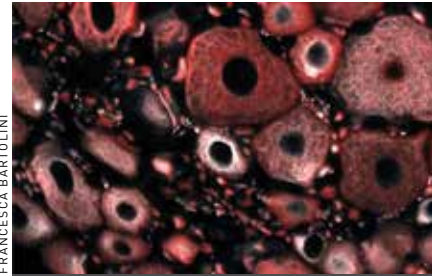
eight years developing the new method to provide more lungs for patients in need of organ transplantation. The latest paper showed how the cross-circulation platform successfully maintained lung integrity and resulted in functional lung recovery. Throughout 24 hours of cross-circulation, the team saw substantial improvements of cell viability, tissue quality, inflammatory responses, and, most importantly, respiratory function. The study was published in *Nature Medicine*.

Palliative Care for Children

The Department of Pediatrics and NYP's Morgan Stanley Children's Hospital opened a palliative care program for children with complex, life-threatening medical conditions. The program supports the medical team and families by managing expectations and ensuring dignified end-of-life care. The program, led by pediatric palliative care expert Max Lindeman, MD, will help families facing a range of medical challenges, such as children born with congenital anomalies or genetic conditions that prevent them from fully developing and children or adolescents who suffer traumatic brain injuries or who have received cancer diagnoses.

Preventing Nerve Damage Caused by Chemotherapy

Drugs are not available to prevent the painful nerve damage many cancer patients suffer during chemotherapy, but a new study has identified one cause of nerve degenera-



MARIA ELENA PERO AND FRANCESCA BARTOLINI

Delta-2 tubulin, a microtubule modification shown in white, accumulates on the microtubules of neurons after treatment with the chemotherapy agent bortezomib, leading to degeneration of the neurons.

tion, perhaps paving the way for drugs to be developed to prevent peripheral neuropathy. Francesca Bartolini, PhD, discovered that seemingly unrelated chemotherapy drugs may induce peripheral neuropathy by affecting the nerve's microtubules. The research was published in the *Proceedings of the National Academy of Sciences*.

National Network of Suicide Prevention Lines

Since the funding of a national network of local, certified call centers by the Substance Abuse and Mental Health Services Administration in 2001, Madelyn Gould, PhD, has been leading the evaluation of the centers' effectiveness. Her evaluations have established the effectiveness of crisis line services as suicide prevention tools while also identifying the need for continued development of a robust and integrated crisis response system to meet the needs of individuals in suicidal and mental health crisis. Her evaluations bolstered the rationale for the establishment

of 988 as the new three-digit dialing code for the National Suicide Prevention Lifeline beginning in July 2022. The Lifeline provides round-the-clock free and confidential support to individuals in distress and to those calling, chatting, or texting out of concern for the well-being and safety of someone else. In 2020, Lifeline centers received 1,833,953 calls, 586,703 chats, and 34,166 texts. The National Suicide Prevention Lifeline network of over 180 individual crisis centers located in every state and the District of Columbia includes over 30 centers that handle crisis chats and texts in addition to calls. The network is linked by one single number: 1-800-273-TALK. Suicide experts hope the three-digit number, 988, will be easier to remember. “When people are overwhelmed and in crisis, their cognitive ability is overwhelmed,” says

Dr. Gould. “A shorter number should make it easier to recall. It is also hoped that the use of 988 rather than 911 will reduce law enforcement involvement in mental health crises.”

Analyzing Stillbirth

Faculty have uncovered an array of new genes that cause stillbirth, significantly increasing the understanding of the condition’s genetic foundations and suggesting that genetic analysis could be used to counsel parents who have previously experienced stillbirth. Using both standard and advanced analysis techniques, a team led by David Goldstein, PhD, and Ronald Wapner, MD, identified the likely genetic cause of stillbirth in about one of every 10 cases studied. The cause of stillbirth is unknown in most cases, and only a few genes have been implicated. The researchers used genomic sequencing

for the first time to search for genetic variants that cause stillbirth. By combining traditional sequencing and new analytical techniques, the researchers found small changes in 13 genes that caused fetal death, six of which had not been linked to stillbirth. The analyses required to find causal genetic causes of a stillbirth can be conducted at only a few academic medical centers, but findings from studies will eventually help more physicians counsel parents and guide clinical care.

New Way to Control Postpartum Bleeding

A multicenter study led by VP&S found that a new intra-uterine device rapidly controlled bleeding in 94% of women with postpartum hemorrhage. The device uses low-level suction to promote uterine contraction, rather than the compression used by older devices. Women

with postpartum bleeding may be treated with medications to help the uterus contract to decrease bleeding, but only a few medications are available and some are not safe for women with asthma or hypertension. “Having a new option to treat women with postpartum hemorrhage could help reduce morbidity and mortality associated with this all-too-common complication of childbirth,” says Dena Goffman, MD.

Multidisciplinary Care for Pregnant Women with Heart Disease

A multidisciplinary cardio-obstetrics team may improve outcomes for pregnant women with heart disease. Researchers reviewed data on 306 pregnant women with cardiovascular disease who were referred to NYP/Columbia’s cardio-obstetrics team over a nine-year period. Most of the infants were delivered at term, with few fetal complications. Less than 2% of the women were readmitted to the hospital within the first 30 days of discharge, most for symptoms of heart failure. The national 30-day readmission rate among pregnant women in the general population is 3.6%. Readmission rates remained low during the first year after delivery. “While cardiologists have been managing the care of pregnant women for decades, the notion of a dedicated cardio-obstetrics team is a recent development aimed at reducing maternal death rates due to cardiovascular disease,” says Jennifer Haythe, MD.



Growth of Primary Care

Plans to expand primary care, in partnership with NYP, resulted in new practice sites for Columbia Primary Care, including a new facility in Manhattan on Broadway at 103rd Street (pictured). Future practices planned for Midtown Manhattan and Westchester will join the five current practices, and planning is underway for practices in three other Manhattan neighborhoods.

Center to Treat Lyme Disease

The Cohen Center for Health and Recovery from Tick-Borne

Diseases opened at Columbia this year as New York City's first center to offer dedicated and specialized care for patients with Lyme disease and other tick-borne diseases. The center is led by long-time Lyme disease physician and researcher Brian Fallon, MD, and co-led by Shannon Delaney, MD. A gift from the Steven & Alexandra Cohen Foundation also funds a national clinical trials network that will focus on identifying more effective treatments.

CAR T-Cell Therapy

For patients with myeloma and certain types of lymphoma and leukemia, chimeric antigen receptor (CAR) T-cell therapy has worked when nothing else, including chemotherapy and bone marrow transplantation, has been effective. The therapy, the most modern and innovative form of cancer immunotherapy, re-engineers a patient's white blood cells to recognize and kill tumor cells. Columbia has so far infused 58 cancer patients with CAR T cells or other forms of immune effector cell therapies. The program also has supported 43 infusions of cell therapies in non-cancer patients through collaborations with solid organ transplant programs and neurology. The five commercially available CAR T cells are being used or being prepared for use in Columbia patients. The team has 19 clinical trials underway to test cell therapies in cancer, ranging from blood cancers (lymphoma, myeloma, and leukemia) to solid tumors (sarcoma, prostate cancer, melanoma, lung cancer, and others). One important clinical trial investigated CAR T-cell therapy for patients with relapsed or refractory indolent

non-Hodgkin lymphoma, such as follicular lymphoma or marginal zone lymphoma. The trial showed complete remissions in 80% of patients who received a single infusion of CAR T cells, "far better than what we can get with most other therapies in cancer," says Ran Reshef, MD. "The results led to the approval of CAR T cells in follicular lymphoma, which is a transformative moment for patients with this disease."

Redefining Physical Activity Recommendations

VP&S and international researchers have identified multiple ways to achieve health benefits from exercise—as long as the exercise "cocktail" includes plenty of light physical activity. The formula of 30 minutes of exercise five days a week needs to be adjusted, says Keith Diaz, PhD, director of the exercise testing laboratory. "Even if you're one of the few adults who can stick to this advice, 30 minutes represents just 2% of your entire day. Is it really possible that our activity habit for just 2% of the day is all that matters when it comes to health?" Recommendations about exercise need to take into account how individuals spend the rest of their waking day. Researchers used activity monitors worn by study participants and came up with a formula of 3 to 1: Three minutes of moderate-to-vigorous activity or 12 minutes of light activity per hour of sitting is optimal for improving health and reducing the risk of early death.

New Ways to Lower Drug-Resistant Blood Pressure

Brief pulses of ultrasound delivered to nerves near the kidney

in a clinical trial produced a clinically meaningful drop in blood pressure in people whose hypertension did not respond to a triple cocktail of medications. The procedure, called renal denervation, enabled daytime blood pressure after two months to drop eight points, compared with three points in patients who received a sham procedure. Nighttime blood pressure decreased by an average of 8.3 points in the treatment group compared with 1.8 points in the other group. "For patients with drug-resistant hypertension, a drop in blood pressure of eight points—if maintained over longer-term follow-up—is almost certainly going to help reduce the risk of heart attack, stroke, and other adverse cardiac events," says Ajay Kirtane, MD. "These results suggest that renal denervation has potential to become an important add-on to medication therapy—including for those who have difficulty managing several medications to control their hypertension." The treatment is still experimental, has not been approved for use by the FDA, and is only available through clinical trials.

"Stage Zero" Breast Cancer

Ductal carcinoma in situ, also called "stage zero" breast cancer, was rarely detected before mammography became routine but today accounts for 20% of breast cancer diagnoses. Physicians have not reached consensus on the best treatment for DCIS, but VP&S experts conducted a novel analysis to identify optimal treatment strategies. For patients with DCIS of average risk, lumpectomy followed by radiation is optimal in balancing all out-

comes. For patients with low-risk disease—which portends a lower predicted risk of recurrence—lumpectomy followed by observation is optimal, but some patient-specific factors could make radiation optimal in these cases. Hormone therapy is not recommended because the side effects often outweigh the therapeutic benefits. To develop the treatment recommendations, experts used data from prior DCIS clinical trials and modeled how different treatment combinations affect recurrence risk, side effects, quality of life, and societal costs (either direct financial costs or indirect costs such as lost work productivity). "Our analysis combines these outcomes into one overall metric that allows us to compare different treatments for patients of different ages and risk levels, which helps to inform the decision-making process," says Apar Gupta, MD. "Physicians and patients alike should consider personal preferences and tolerance for side effects versus the risk of recurrence."

Therapy for Aggressive Form of Uterine Sarcoma

A clinical trial conducted by the Herbert Irving Comprehensive Cancer Center has demonstrated the potential of targeted therapy in combination with chemotherapy to treat patients with uterine leiomyosarcoma, a rare, aggressive form of cancer often discovered too late because most patients show no symptoms before diagnosis. The trial, which tested a novel precision medicine therapy called olaparib, a PARP inhibitor originally developed for individuals with BRCA1 or BRCA2 mutations, resulted

in durable responses with a progression-free survival of almost seven months in a group of patients who progressed after front-line chemotherapy. The trial involved 22 patients who received olaparib combined with a low dose of temozolomide, a chemotherapy drug. Based on the promising initial results, the team, led by Matt Ingham, MD, and Gary K. Schwartz, MD, is developing a large, randomized phase 3 clinical trial to test this drug combination against the current standard of care.

Men's Health

Men seek out health care less than any other group, but a new men's health program has opened to help men gain access to care by Columbia physicians. The program is led by Joseph P. Alukal, MD. Primary care physicians, urologists, and cardiologists work together to offer high level care to men throughout New York City, Westchester County, and the

tri-state area. Care is coordinated such that the patient can be seen or have a virtual visit with multiple doctors within just a day or two of contacting the program. The program uses new algorithms to identify the doctors a patient needs to see. "Men can go to our website, answer some questions online, and we'll figure out which doctors are best to deliver the care that they need. We arrange appointments with those doctors, including telehealth visits, so the patient may only have to leave their house once if at all."

Epic at 1 Year

The first year after Columbia, Cornell, and NYP launched Epic, a digital platform that integrates electronic health recordkeeping with scheduling and billing software and a patient portal, coincided with the pandemic, accelerating plans to slowly engage patients with virtual visits. The launch of Epic allowed Columbia's faculty practice to complete an

emergency rollout of telemedicine and accommodate rapid growth to allow physicians to continue to care for patients during the pandemic's lockdown. Since Epic was launched Feb. 1, 2020, it has reduced response time to patient-related calls and prescription requests, reduced registration time, and increased e-check in rates. For physicians, it has reduced manual composition of progress notes and increased use of documentation tools.

Taking Care of People Who Take Care of People

When the toll of the pandemic on health care professionals became clear in 2020, CopeColumbia was created to foster collective well-being and resilience by sharing evidence-based coping strategies, facilitating access to peer support, and contributing to an inclusive and compassionate culture for Columbia and NYP faculty and staff. CopeColumbia offered bilingual resources and

offered support through 250 one-to-one peer sessions, 260 support groups, and over 100 town halls meetings during its first year.

Telehealth Boom

Telehealth before the pandemic accounted for less than 0.2% of all visits to Columbia physicians. By the end of the first



few months of the pandemic, telehealth visits accounted for 74% of all visits, while in-person visits were only for urgent and emergency conditions. By May 2021, patient visits had surpassed 2019 volumes. Telehealth will remain a significant part of patient care, accounting for 22% of patient volume at the end of fiscal 2021.

VP&S Education Highlights

International Exchange

During eight weeks last summer, 70 students from 12 universities across the world—including 16 medical, dental, and premedical students from Columbia—shared their COVID-19 experiences virtually via the "International Collaboration and Exchange Program – Preparing Global Leaders for Healthcare." The exchange program aims to

deepen intercultural competency and leadership in students. Last summer's content focused on COVID-19, especially as it relates to research. The exchange program started in 2014 in the Department of Pathology & Cell Biology to offer medical, premedical, and dental students early international experiences, both in person and online, throughout the school year. The sum-

mer portion of the program typically includes in-person travel exchanges, but students met virtually instead during the pandemic. Columbia students and their counterparts at universities in 12 partner countries, including Austria, Canada, Japan, Taiwan, and the UK, met online for small group discussions, weekly large group debates, networking, and faculty presentations

via Zoom followed by Q&As led by student moderators.

Summer "CURE" for Budding Scientists

The Herbert Irving Comprehensive Cancer Center helps undergraduate and local high school students through CURE—or Continuing Umbrella of Research Experiences. The two-year program gives students hands-on experience

riences in science, medicine, and research and includes mentorship and professional development. The program focuses on individuals from low-income communities, first-generation college students, and individuals underrepresented in medicine and science. Twelve undergraduate and high school students work in labs, participate in scientific research, connect with Columbia faculty mentors, and attend presentations by scientists and physicians. The program hosts a one-week scientific enrichment program for a wider audience and during the pandemic held a month-long summer program that offered courses for nearly 200 students who logged on three days each week. Courses included cancer risk reduction, hypothesis development, and scientific study design. Programming was offered on career advice in science and medicine, and the students heard lectures about cancer research, cancer health inequities, and COVID-19. Students engaged in working groups to develop anti-vaping, HPV vaccination, and sun screen campaigns.

First Virtual White Coat Ceremony

Among many virtual events during the pandemic was the first virtual White Coat Ceremony in August 2020, when 140 members of the VP&S Class of 2024 were welcomed to medical school. Members of the class finishing its first year—the Class of 2023—shared words of wisdom from their medical school experiences. Members of the Class of 2024 put on their white coats as their names were announced

at the ceremony. After all names were read, the new students shared their screens for the first look at the new class. The Class of 2024 was chosen from a field of more than 7,000 applicants. Women make up almost half of the class, 22% of the class belong to groups underrepresented in medicine, and 7% of the students are first-generation college students.

Apgar Academy Awards

The Virginia Apgar Academy of Medical Educators promotes, rewards, and supports the teaching mission that trains medical students, residents, fellows, and faculty. The academy welcomed 11 new members this year and named Jean-Marie Alves-Bradford, MD, the 2021-2022 Vanneck-Bailey Scholar. The award supports a faculty member in developing educational programs that will “ensure that VP&S students are among the finest physicians entering the profession, skilled in the knowledge and practice of medicine and modeling compassionate, humanistic care to all patients.” The academy presented Beth Barron, MD, with the 2020 Virginia Apgar Academy Education Research Grant to support development of a faculty-student progress coaching aid in collaboration with the VP&S Center for Education Research and Evaluation.

Innovation in Health Professions Education

VP&S created a new Office of Innovation in Health Professions Education this year to integrate Columbia’s institutional resources in health care, business, law, journalism, and beyond to develop cutting-edge

health professions education. The office, led by Jonathan Amiel, MD, brings together education leaders from across the medical school, medical center, and Columbia to envision new emerging roles for health care leaders and design the interdisciplinary training they will need to lead change. The office also offers mentoring for faculty in educational innovation and scholarship and, on Columbia’s behalf, works with national organizations to shape health professions education policy and strategy.

Anti-Racism in Education

The VP&S education office launched several anti-racism initiatives as part of the medical center’s comprehensive anti-racism initiative. Linda Aponte-Patel, MD, and Sidney Hankerson, MD,

co-chaired a task force that posted recommendations last fall. Hetty Cunningham, MD, was appointed director of equity and justice in curricular affairs. A new equity and justice fellowship for VP&S students was launched. Curricular changes were introduced across the curriculum, some in partnership with colleagues at Teachers College, and updated guidelines were implemented to eliminate bias in the curriculum. The Office of Diversity and Multicultural Affairs added five faculty advisers.

Welcome, Class of 2025

The VP&S Class of 2024 posted an early welcome for the Class of 2025. When the first-year class was constituted in June, the Class of 2024 taped a musical video to welcome the incoming students. The



2021 Residency Match

Members of the VP&S Class of 2021 received their match results via email on March 19, and some of the fourth-year students were able to celebrate in person amid pandemic precautions. Many visited the lobby of the Vagelos Education Center in the afternoon for a physically distanced event, arriving one by one to receive a copy of their match letter, a swag bag of goodies, and congratulations from the medical education deans. VP&S had 154 students participating in this year’s match.

students introduced the new class to the neighborhood in a video based on songs from the Broadway hit musical “In the Heights” and its 2021 movie adaptation. The video was directed, produced, and edited by members of the Class of 2024. “Entering medical school can be very intimidating, so we hoped this video would demonstrate that we do have the time and energy to be goofy and have fun outside of classes,” says Adrianna Bergstein, a member of the Class of 2024 who helped to organize the video. The medical students spent most of the spring working on the project. They began casting in March, spent

April recording the vocals and instrumentals, filmed in May, and completed editing in June. Adds Megan Chung, a member of the Class of 2024 who helped to organize the video: “It was a very strange year to apply for medical school for the incoming students, since their interviews were done virtually and they weren’t able to visit our campus. We wanted to showcase how beautiful Washington Heights is and highlight some of the spots that they can expect to frequent.”

New Clerkship

Starting with the Class of 2023, rotations for medical students include a clerkship

in emergency medicine. The clerkship assigns students to clinical shifts at New York-Presbyterian sites at the Columbia campus and at the Allen Hospital over a two-week period. Students work with emergency medicine attending physicians during their clinical shifts, and they work one shift with a nurse and shadow a resident who sees critical care patients. Teaching materials include in-person instruction, case-based scenarios, simulation center sessions, hands-on ultrasound training, and asynchronous modules. When the clerkship started for the Class of 2023 after its transition to the major

clinical year, pandemic safety measures were followed to limit areas of the emergency department to one student per area. According to the Association of American Medical Colleges, about 60% of medical schools have an emergency medicine clerkship, but many occur in the fourth year.

Highest Medical School Ranking

VP&S ranked No. 4 among research-oriented medical schools in this year’s U.S. News & World Report’s graduate school rankings. The ranking is the highest for VP&S in the history of the publication’s rankings of medical schools. VP&S tied with Stanford University and the University of California, San Francisco, at the No. 4 spot. The ranking marks a rise from the previous year, when VP&S ranked No. 6 in a tie with the Mayo Clinic School of Medicine, UCLA, UCSE, and Washington University. VP&S departments continue to rank highly. Rankings of specialties among medical schools put internal medicine and psychiatry at No. 6, anesthesiology and obstetrics & gynecology at No. 7, surgery at No. 8, radiology at No. 11, and pediatrics at No. 13. Clinical departments are also ranked in U.S. News & World Report’s Best Hospitals rankings, which are announced each July. In the 2021-22 hospital rankings, five NYP specialties ranked in the top five nationwide: neurology/neurosurgery (No. 2), cardiology and heart surgery (No. 4), psychiatry (No. 4), rheumatology, a collaborative program with the Hospital for Special Surgery (No. 4), and diabetes/endocrinology (No. 5).



Centennial of Women MDs at VP&S

The 2021 VP&S graduation marked a milestone: the 100-year anniversary of women graduating from Columbia with MD degrees. Six women received MD degrees from Columbia on June 1, 1921, including the woman who successfully lobbied for the medical school to admit women: Gulli Lindh Muller, who graduated first in the class. Since that June 1, 1921, graduation day, VP&S has graduated more than 3,300 women, including the 82 women in the Class of 2021.



First Genetic Counseling Graduates

The first 11 students to complete the genetic counseling graduate program received master's degrees at a graduation ceremony in May 2021. The two-year program trains students in clinical genetics, counseling, communication, genomic medicine, precision medicine, and the social implications of advancing technologies. "I cannot say that I would have chosen to be a student during the pandemic, yet I also feel incredibly lucky to have been one," said one of the graduates, Bree Martin. "Thanks to the amazing job our faculty did at transitioning to telemedicine, I don't feel I missed out on that much clinic experience."

VP&S Community Highlights

Academy of Community and Public Service

The Academy of Community and Public Service, started in 2020 to recognize VP&S faculty members for their commitment to the community, expanded this year to include faculty from the medical center's nursing, dental, and public health schools. The academy is thought to be the first faculty academy among health sciences institutions in the country to recognize service efforts. The 18 new members were inducted in June. Faculty tapped for membership are recognized for going above and beyond to promote clinical care, medical education, and research in the Upper Manhattan community and around the world. Members' work in the community this year included supporting neighborhood vaccination efforts, raising awareness of vaccine hesitancy, addressing structural racism, and providing local residents with myriad resources for coping with the social, economic, mental health, and medical challenges brought by COVID. The academy is

part of the Office of Community Service Programs, led by Rafael Lantigua, MD.

Partnership with Dominican Medical Association

In collaboration with the Dominican Medical Association, New York-Presbyterian and Columbia hosted a series of educational webinars for community physicians to address questions about the pandemic and vaccines. Topics covered included the impact of COVID-19 on patient care in the emergency department, the pandemic's impact on community mental health, and telehealth. The Community Physicians Webinar Series reflected the hospital and medical center's commitment to improving health in the community.

Vision Screening in NYC Public Housing

Faculty in the Department of Ophthalmology began visiting community rooms or lobbies of some New York City Housing Authority developments in Washington Heights and East Harlem to offer free vision

screening and eye exams to residents age 40 and older. The study, funded by the CDC Vision Health Initiative, aims to prevent vision loss through early detection, treatment, and follow-up. Only half of American adults have regular eye exams, says Lisa Hark, PhD. "We hope that bringing vision screening and eye exams to people where they live will lead to earlier detection, follow-up eye care, and treatment of glaucoma, cataracts, diabetic retinopathy, and vision impairment in residents who may not be getting regular eye exams." The program plans to offer vision screening to more than 1,000 residents over age 40 with screening repeated in a year.

The Power of Music

Hip Hop Public Health, a community outreach organization founded by Columbia neurologist Olajide Williams, MD, used the power of music in a series of rap videos to increase COVID-19 vaccination among communities of color. The videos were featured on "PBS News Hour." The goal of the



videos was to increase vaccine literacy by demonstrating three facts: The vaccine is safe; no scientific shortcuts were taken in developing the vaccine; and being vaccinated is an act of community service. "Community Immunity: A Rap Anthology about Vaccines" included five animated videos featuring Grammy award-winning rapper Darryl DMC McDaniels of Run-DMC. The videos were introduced at community mobilization events in partnership with New York state, HeartSmiles, and the New York City Department of Education.

Psychiatry, New York Public Library Partnership

The Department of Psychiatry and the New York Public Library joined forces in an innovative public health initia-

tive to help New York City neighborhoods dealing with the mental health fallout of the COVID-19 pandemic. The post-COVID Community Mental Health Project, supported by private donations, works to increase public access to mental health information; educate communities on mental health risks, including addiction; engage residents in supporting each other's well-being; and improve connections to behavioral health services. The post-COVID Community Mental Health Project builds on initial work done by NYPL, which offers free mental health resources, programs, and training at

more than a dozen branches in the Bronx, Manhattan, and Staten Island.

Partnering with Community Health Workers

Partnering with the communities surrounding VP&S is one of the medical school's core missions, but that mission took on new urgency this year. Several medical center offices joined community health workers serving Upper Manhattan to navigate the pandemic and vaccinations. The Columbia Community Wellness Center, the Office of Community Service Programs, the Office of Government and Community Affairs, and the Center for Community Health Navigation of

NewYork-Presbyterian's Ambulatory Care Network launched the Community Health Workers Town Hall Series to provide information and practical resources about COVID-19 vaccines. Community health workers serving Harlem, Washington Heights, Inwood, and the South Bronx participated in discussions that covered vaccine safety and efficacy, vaccine hesitancy, inequitable vaccine distribution, post-COVID syndrome, and COVID-related mental health concerns. The town hall series was co-led by Rafael Lantigua, MD, and Olajide Williams, MD. "Trust needs to be earned," says Dr. Williams. "It begins with transparency and partnership. With these town halls, we are being completely transparent about the science of what we know and what we don't know. We are extending the hand of true partnership, so that we can learn and grow from each other."

Partnering with Taxi Drivers

VP&S faculty participated in an educational webinar on vaccines hosted by the New York City Taxi and Limousine Commission for licensed TLC drivers. The webinar addressed frequently asked questions and concerns about the vaccine and shared information about how the vaccines work, vaccine efficacy, and where drivers could get vaccines. The webinar launched a community health partnership with the TLC to promote health and wellness among taxi drivers. Future plans include a health resource fair.

Help for Community Elders

A research group that has been active in the community for nearly 30 years—mostly conducting aging and memory

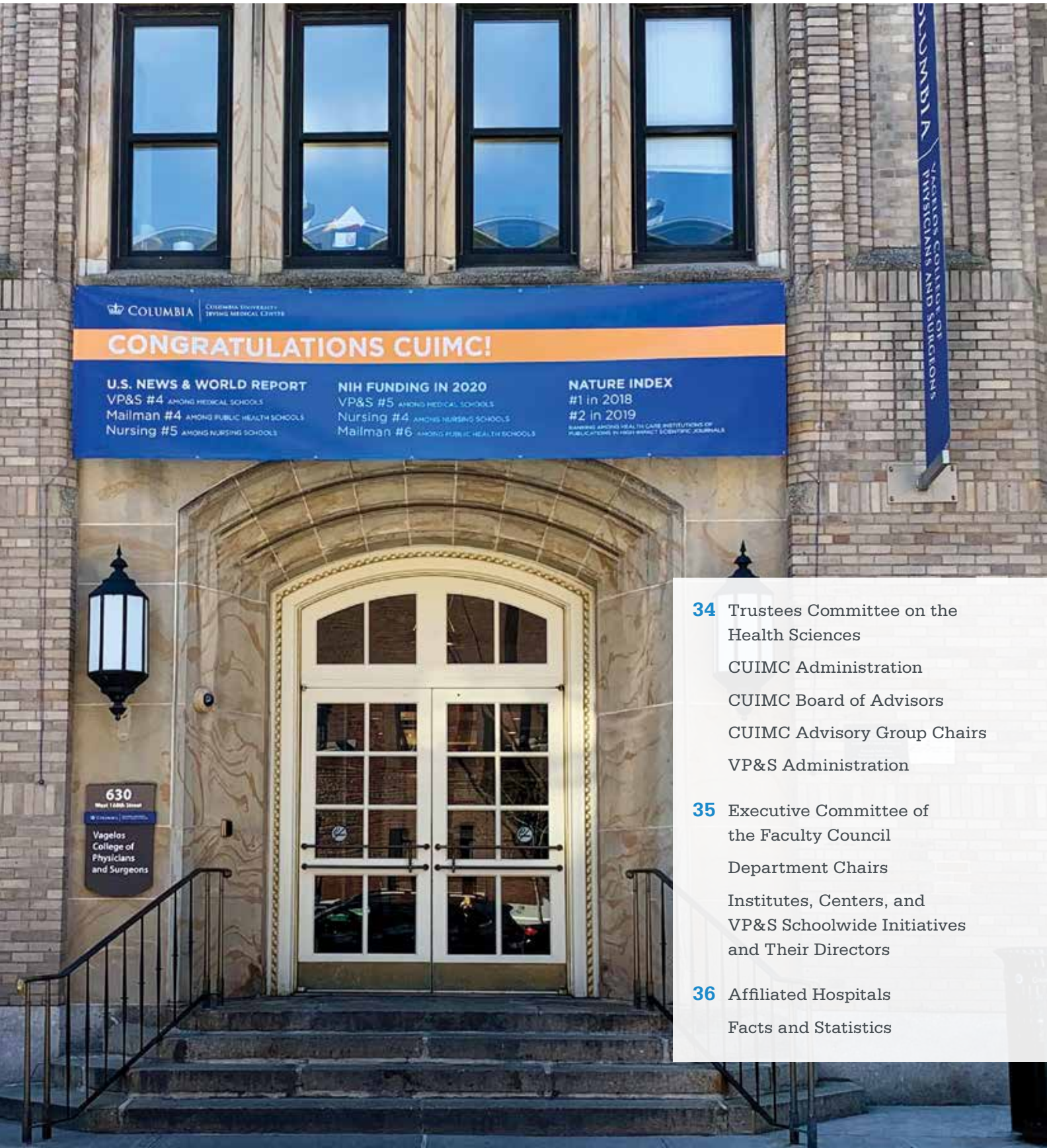
research—pivoted to become a critical lifeline for community elders in Northern Manhattan during the pandemic. The Washington Heights-Hamilton Heights-Inwood Columbia Aging Project (WHICAP), led by Richard Mayeux, MD, and his colleagues, Rafael Lantigua, MD, Jennifer Manly, PhD, and Adam Brickman, PhD, has followed community elders since 1992 to determine factors that contribute to the aging process and dementia. The project has cultivated trust and longstanding relationships with more than 8,000 community elders over the years, including 1,000 community elders currently visited by WHICAP researchers. "As soon as we went from in-person visits to remote contact, we knew the kind of calls and conversations that were ahead of us," recalls Danurys "Didi" Sanchez, WHICAP project coordinator. "There were going to be more pressing needs, different needs, and we got ready right away." The team created a resource list and began contacting participants by phone. Many project participants were afraid to meet basic needs by grocery shopping and doing laundry. For some, WHICAP was their only way to connect with community organizations. WHICAP used relationships with community groups to connect elders with everything from grocery delivery and rent assistance to legal help and laundry service. "We've always done this sort of work, but it ramped up and became more critical than ever as soon as the pandemic started," Ms. Sanchez says. WHICAP also partnered with NewYork-Presbyterian to schedule vaccine appointments for community elders.



Vaccination Pop-Ups

A Columbia Community Pop-up Vaccination Site in Manhattanville vaccinated 700 New Yorkers over four weekends this spring. New Yorkers from Harlem, Northern Manhattan, and Morning-side Heights were vaccinated at the site, organized by Columbia's Community Wellness Center, the medical center's Office of Community Service Programs, and ColumbiaDoctors and supported by multiple public and private health care providers. The Columbia Community Wellness Center, located on the ground floor of the Jerome L. Greene Science Center on Columbia's Manhattanville campus, provides health resources to area residents, including initiatives that train members of the Harlem community to become health advocates to prevent stroke and promote mental health. The center also offers free cholesterol and blood pressure screenings, health insurance enrollment, and weight counseling.

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Helen Hayes Hospital
West Haverstraw, NY

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FACTS & STATISTICS, FY21

MEDICAL SCHOOL ENROLLMENT, FALL 2020

Total medical school enrollment	585
Enrollment of in-state residents	255
Enrollment of international/nonresident students	12
Enrollment of men	299
Enrollment of women	286

ENROLLMENT BY YEAR

	MALE	FEMALE
First-year class	72	66
Second-year class	70	70
Third-year class	66	56
Fourth-year class	91	94
Total enrollment	299	286

MEDICAL SCHOOL ETHNICITIES

Hispanic/Latino	62
Black or African American, non-Hispanic/Latino	55
White, non-Hispanic/Latino	278
American Indian or Alaskan Native, non-Hispanic/Latino	2
Asian, non-Hispanic/Latino	123
Two or more races, non-Hispanic/Latino	23
Race and/or ethnicity unknown	30

APPLICATIONS (CLASS ENTERING FALL 2020)

Number of applicants	7,293
Acceptance rate	4%
Yield on accepted students	47%
Number of underrepresented minority students	22%

DEGREES GRANTED, FY21

MD	205
PhD	75
Doctor of physical therapy	66
MS in nutrition	79
MS in occupational therapy	57
MS in genetic counseling	11
Certificate in psychoanalysis	7

FACULTY, 2020-21 ACADEMIC YEAR

Full-time faculty	2,119
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FACULTY HONORS, CURRENT FACULTY

Nobel Prize	3
National Academy of Sciences	25
National Academy of Medicine	53
American Academy of Arts and Sciences	26
Howard Hughes Medical Institute	6

FINANCIALS, FY21 (EXCEPT WHERE NOTED)

Budget	\$2.4 billion
Philanthropic support	\$194 million
Endowment	\$2.73 billion
Endowed chairs/professorships	304
NIH research support (Federal FY 2020)	\$496 million



PHOTOS BY MICHAEL DIVITO

STREET NAMING HONORS COLUMBIA, NYP HEROES

THE ONE-BLOCK STRETCH of 168th Street between Broadway and Fort Washington Avenue was co-named Healthcare Heroes Way in May and celebrated during a ceremony that included employees, elected officials, and community members. The co-naming honors health care workers who have served on the front lines of the COVID-19 pandemic.

The event was sponsored by Manhattan's Community Board 12, which represents Washington Heights and Inwood, and New York City Council Member Ydanis Rodriguez.

Angela Mills, MD, the J.E. Beaumont Professor of Emergency Medicine at CUMC and chair of emergency medicine at VP&S, offered remarks at the ceremony. "The co-naming of Healthcare Heroes Way is an incredible honor recognizing our medical center and is deeply appreciated by our entire staff, especially following this most challenging year," Dr. Mills said. "We are thankful to the members of our community who place their trust in us each and every day for their care and the care of their loved ones."

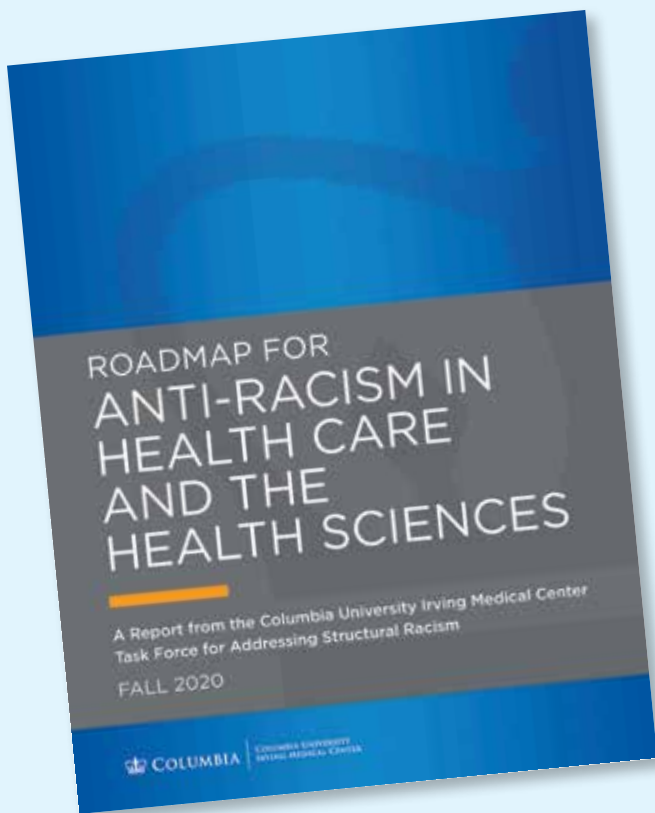
"The naming of this street is a wonderful tribute to the thousands of health care providers, medical researchers, students, administrators, technicians, public health workers, facilities and security personnel, and many others in crucial support roles who have played such an important role in fight-



ing this pandemic," said Anil K. Rustgi, MD, Interim Executive Vice President and Dean of the Faculties of Health Sciences and Medicine. "We are truly humbled by the community's support throughout this historic crisis."

The movement to co-name the street began in 2020 with a community-led effort spearheaded by Daryl Cochrane, who is serving his third term on Community Board 12. "I hope co-naming this street Healthcare Heroes Way is the first of many recognitions for those who saved our city and our community from one of the worst crises of our lifetime. These real-life heroes continue to be professional and compassionate in the face of uncertainty."

Reinforcing Principles of Equity, Inclusion, and Excellence



“Our self-reflection and actions at this time must be focused on the elimination of racism in all aspects of our work. We need to rethink how we eliminate disparities in health outcomes, to consider whether current health care educational paradigms adequately disseminate anti-racism and to assess how to broaden our research to discover and implement solutions to health inequities.”

— Roadmap for Anti-Racism in Health Care and the Health Sciences, Fall 2020, from the Columbia University Irving Medical Center Task Force for Addressing Structural Racism