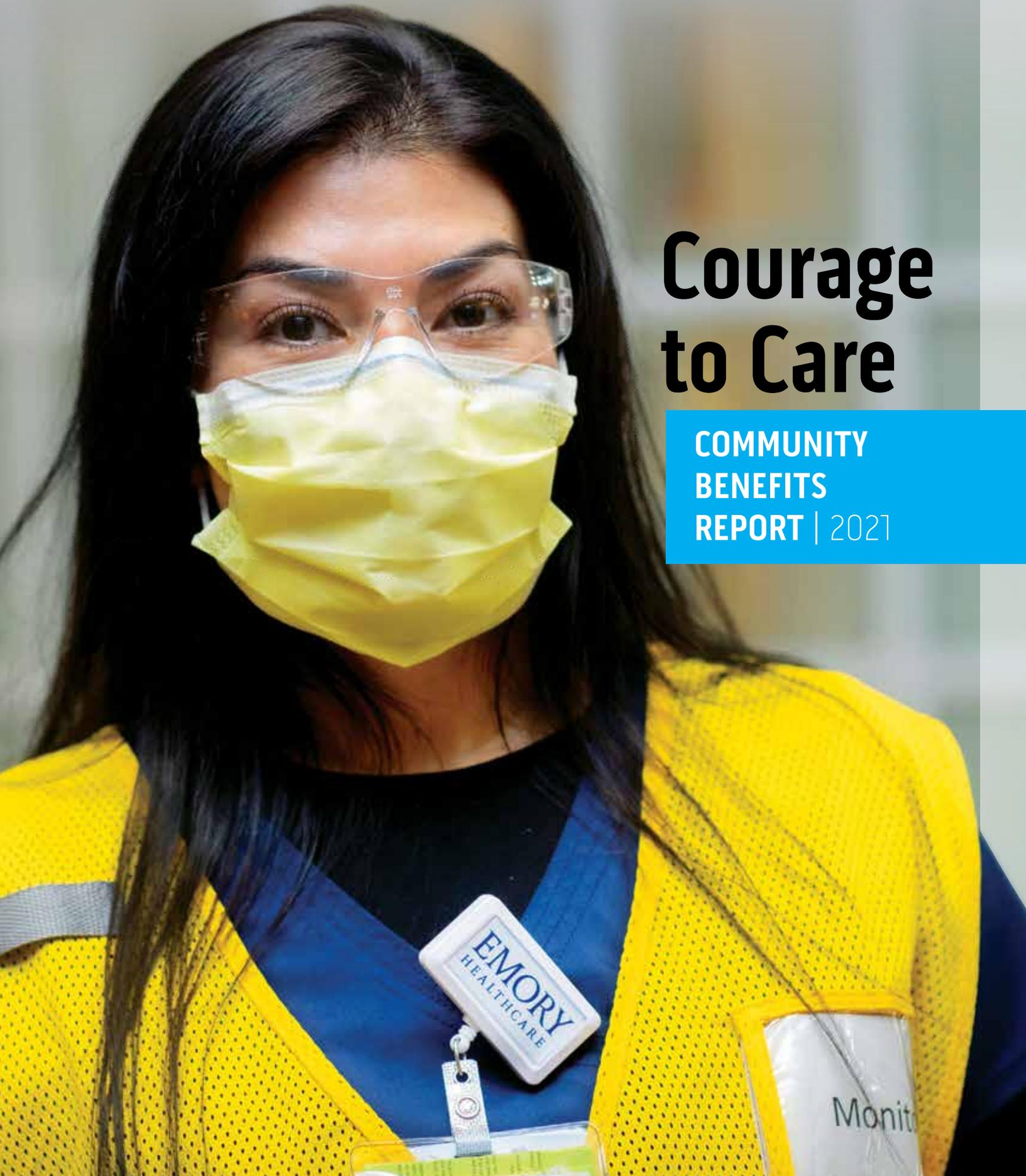




EMORY | WOODRUFF HEALTH SCIENCES CENTER

Courage to Care

COMMUNITY
BENEFITS
REPORT | 2021





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SUSTAINING A VISION FOR THE COMMUNITY

Robert W. Woodruff—the health sciences center's namesake and longtime leader of The Coca-Cola Company—dedicated his life to supporting the community, and his legacy lives on in the work this report describes.



ON THE COVER: Lady Duarte, one of the Emory Healthcare staff who administered vaccines at the Northlake Mall.

Photography: For images shot after the onset of COVID-19, masks are used.

Putting patient well-being above all else has always been a feature of Emory Healthcare and the Woodruff Health Sciences Center—and never more so than during the pandemic.

“We are deeply appreciative of the dedication and resilience shown by our staff and physicians during the COVID-19 pandemic, as we work to improve lives and provide hope to those we serve,” said Jonathan S. Lewin, executive vice president for health affairs, executive director of the Woodruff Health Sciences Center, and CEO and chair of the board of Emory Healthcare.

The numbers tell a story of resilience and innovation. Admitted COVID-19 patients totaled 8,593, of whom 1,871 required intensive care. Ninety-three percent of our patients returned home, which is among the highest percentages in the nation. For COVID-19 patients who could not pay and qualified for the Health Resources and Services Administration (HRSA) COVID-19 Uninsured Program, Emory provided \$33 million in unreimbursed care.

In discovery work related to COVID-19, Emory researchers have reached deep, finding new pathways to improve therapeutics, testing, and vaccines. With the eyes of the world trained on Emory in December 2021, the US Food and Drug Administration announced that molnupiravir, an investigational oral antiviral discovered here, had received Emergency Use Authorization for treatment of COVID-19.

“Care” cannot live up to its name unless it means care for all, and Emory is working to dismantle health disparities. In the words of Lewin, “We define equity as creating a fair playing field in which every team member and patient has equal opportunity to succeed and attain their full health potential regardless of who they are.”

Emory educates with an eye toward future need—creating a new certificate program in climate change and health in the Rollins School of Public Health, transforming the medical school curricula, and leading nursing education in the 21st century through the Emory Nursing Learning Center.

But there is a simpler way to understand the mission of our health care staff, researchers, and educators.

They have the courage to care.



Emory Healthcare provided
a total of **\$124.6 million**
in charity care in FY2020–2021.



THE TERM “CHARITY CARE” INCLUDES TWO CATEGORIES: (1) indigent care for patients with no health insurance, not even Medicaid or Medicare, and no resources of their own and (2) catastrophic care for patients who may have some coverage but for whom health care bills are so large that paying them would be permanently life-shattering.

The box below details the charity care provided at individual Emory Healthcare facilities. Included elsewhere in this book is information about uncompensated care provided by Emory physicians who practice at Grady Memorial Hospital and other facilities.

In addition to charity care, Emory Healthcare provides many other services to help improve access to care, advance medical knowledge, and relieve or reduce dependence on taxpayer-funded community efforts. This total for Emory Healthcare was an additional \$214 million in FY2020–2021.

Examples of what this additional total includes:

- \$162 million shortfall between Emory Healthcare’s cost to provide care to Medicaid patients and Medicaid reimbursement;
- \$41 million in costs to Emory Healthcare for the Georgia provider tax, which supports the state’s Medicaid budget and helps maintain payment levels for all Medicaid providers; and
- \$11 million for activities such as discounted/free prescription drug programs; programs and contracted services for indigent patients; in-kind donations to organizations such as MedShare; transportation services; blood drives; subsidized continuing care, nursing home care, and home care; sponsorship of selected charity health-awareness events; and educational programs for the public, future health professionals, and patients.

CHARITY CARE TOTALS FY2020–2021

Emory University Hospital and Emory University Orthopaedics & Spine Hospital	\$32,180,000
Emory University Hospital Midtown	\$37,308,000
Emory Rehabilitation Hospital	\$728,000
Emory Saint Joseph’s Hospital	\$14,548,000
Emory Johns Creek Hospital	\$4,735,000
Emory Clinic	\$17,919,000
Emory Specialty Associates	\$2,236,000
Budd Terrace skilled nursing facility	\$1,165,000
Saint Joseph’s Medical Group (ESA)	\$534,000
Emory Decatur Hospital/Emory Hillandale Hospital/ Emory Long-term Acute Care	\$13,255,000
Total	\$124,608,000

Molnupiravir, discovered at Emory, is the **world's first approved** oral medication for COVID-19.



IN YEAR TWO OF THE GLOBAL FIGHT AGAINST COVID-19, Emory researchers have remained at the frontlines. “Emory scientists have been involved in the discovery and development of virtually all of the key tests, treatments, and vaccines being used to fight COVID-19,” says Jonathan S. Lewin, executive vice president for health affairs, executive director of the Woodruff Health Sciences Center, and CEO and chair of the board of Emory Healthcare.

MOLNUPIRAVIR: FIRST APPROVED ORAL ANTIVIRAL FOR COVID-19

On December 23, 2021, the US Food and Drug Administration (FDA) announced that molnupiravir, an investigational oral antiviral discovered at Emory, had received Emergency Use Authorization for treatment of COVID-19. In November, British regulators had approved it for at-risk patients with mild to moderate cases, making it the world’s first authorized oral medication for COVID-19.

The scientist behind the discovery is George Painter—CEO of Drug Innovation Ventures at Emory and director of the Emory Institute for Drug Development. He had been focused on discovering antiviral agents for influenza and emerging diseases, including highly pathogenic coronaviruses. With the emergence of COVID-19, Painter shifted his focus in the hope of reducing suffering and saving lives. He succeeded: molnupiravir works by tricking the enzymatic machine that copies the virus’s RNA genome into making errors.

Painter is no stranger to drug development as the coinventor on more than 120 patents, fourteen of which have led to commercially available drugs or combinations for the treatment of hepatitis B, HIV, and smallpox. Nevertheless, as someone who is “always nose down, getting things done,” he confesses, “I hadn’t even thought about the breadth of the impact molnupiravir might have. When

there was immediate response globally, it was a little overwhelming.”

Molnupiravir will be available for use in 105 low- and middle-income countries. Emory and the pharmaceuticals involved in its development—Merck and Ridgeback Therapeutics—have agreed not to receive royalties for sales in those countries as long as COVID-19 remains classified as a public health emergency of international concern by the World Health Organization.

BARICITINIB: EMORY’S FIRST APPROVED COVID-19 DRUG

Given the flurry of work by Emory researchers in response to the pandemic, molnupiravir isn’t even the first approved COVID-19 drug credited to Emory. That distinction goes to baricitinib, an arthritis medication marketed by Eli Lilly that Emory researchers discovered could be used to treat the complications of severe COVID-19. With its anti-inflammatory properties, it has emerged as an important treatment option for hospitalized patients needing supplemental oxygen, ventilation, or life support.

“Our extensive work with JAK inhibitors in the HIV space became a roadmap for tackling COVID-19 in record time.”

—Christina Gavegnano

George Painter shifted his research focus to molnupiravir.



PHOTO: KAY HINTON

Baricitinib was originally approved in combination with the antiviral drug remdesivir but now can be used without remdesivir for hospitalized patients needing supplemental oxygen, ventilation, or life support. Currently, the National Institutes of Health’s (NIH) COVID-19 treatment guidelines recommend baricitinib as a therapeutic option, added to dexamethasone, for patients who have been recently hospitalized with systemic inflammation and rapidly increasing oxygen needs.

Prior to the discovery about baricitinib, Emory researchers had been studying a similar drug for use against HIV. Both are members of a class of drugs known as JAK inhibitors (Janus kinase inhibitors).

“Our extensive work with JAK inhibitors in the HIV space became a roadmap for tackling COVID-19 in record time,” says Christina Gavegnano, assistant professor in the Emory University School of Medicine (SOM).

DIAGNOSTIC TESTING

In May 2020, the SOM, Children’s Healthcare of Atlanta, and Georgia Institute of Technology received \$31 million

from the NIH’s Rapid Acceleration of Diagnostics (RADx) program to transform innovative technologies into widely accessible COVID-19 diagnostic testing. In October 2020, the NIH awarded the Atlanta team an additional \$18.2 million and in January 2022 upped support by \$15.4 million.

“Our researchers have been ‘testing the tests’ for our nation, taking the most promising and innovative COVID-19 diagnostic tools submitted to RADx and objectively putting each one through its paces to determine its accuracy and viability,” says Greg Martin, a principal investigator as well as professor of pulmonary and critical care at the SOM and chair of critical care for the Grady Health System.

As the *New York Times* recently reported, the team of 200—which includes physicians, engineers, biochemists, and more—has logged great effort to speed up development of new tests and offer assurances that existing products catch new variants of SARS-CoV-2. The Atlanta team “has been absolutely heroic,” notes Bruce Tromberg, director of the NIH’s National Institute of Biomedical Imaging and Bioengineering. RADx has supported

29 manufacturers that have received 40 FDA authorizations for COVID-19 tests, including seven over-the-counter products, all of which have been evaluated by the Atlanta team.

COVID-19 SURVIVORS RETAIN LONGER IMMUNITY

Early reports during the pandemic indicated that protective neutralizing antibodies did not last in COVID-19 patients. An Emory study is the most comprehensive of its kind and indicates that recovered COVID-19 patients retain broad and effective longer-term immunity to the disease. The findings have implications for expanding understanding about human immune memory as well as future vaccine development for coronaviruses.

Not only did immune response increase with disease severity but also with each decade of age regardless of disease severity, suggesting additional unknown factors influencing age-related differences in COVID-19 responses. The picture emerging indicates the body's defense shield produces an array of neutralizing antibodies but also activates certain T and B cells to establish immune memory, offering more sustained defenses against reinfection.

BRAVE KIDS TESTING VACCINES

Headlines at the start of the pandemic created the impression that children were being spared as far as the virus was concerned. That was before a better understanding of the delayed complications of COVID-19, the emergence of the more infectious Delta and Omicron variants, and the mid-2021 surge of infections that affected children and adults.

Vaccines from Pfizer and its partner BioNTech were approved by the FDA for children from ages 5 to 11 and 12 to 17. Booster shots of Pfizer's vaccine recently became available for children ages 5 through 11 as well as teens 12 and older.

More than 400 young volunteers who participated in clinical trials at Emory-Children's Center have been a part of making those vaccine approvals happen. In May 2021, when Emory announced the opening of COVID-19 vaccine studies for children younger than 12, there was strong interest from Atlanta-area parents.

Although the kids who participated got something out of the trials—being vaccinated before their peers—they also

took a risk by trying something then untested in children. They, in turn, provided benefits to others their age as well as adults in the community.

Isabel Sandea, a 10-year-old participant, noted, "I hate the pandemic and want it to be over."

Though the risk of mortality from COVID-19 is lower for children, they too can die from it. And COVID-19 can lead to frightening complications, such as MIS-C (multi-system inflammatory syndrome in children). In the surge of infections that began in fall 2021, children were affected more than in previous waves, with cases in Georgia among children rising to 30 percent of the total.

Jack Shaeffer, an 11-year-old participant, had it right as he made his arm available. In his words, "The faster we do this vaccine, the faster the world gets back together."

NEXT-GENERATION VACCINES

The Hope Clinic of Emory Vaccine Center is participating in a clinical study of second-generation COVID-19 vaccines developed by Gritstone Oncology. The work is being conducted through the Infectious Diseases Clinical Research Consortium (IDCRC).

Gritstone's investigational COVID-19 vaccines incorporate elements of the SARS-CoV-2 virus beyond the spike protein, which is what currently available vaccines target.

"This research is an important test of approaches that could help us manage SARS-CoV-2 viral variants and possibly provide flexible immunity," says Nadine Rouphael, executive director of the Hope Clinic and professor of medicine in the SOM.

VACCINATION DURING PREGNANCY AND POSTPARTUM

An Emory study is evaluating immune responses to COVID-19 vaccines administered during pregnancy or within two months after delivery. Called SARS-CoV-2 Vaccines in Pregnancy and Postpartum, or MOMI-Vax, the study is funded by the National Institute of Allergy and Infectious Diseases (NIAID) and being conducted by the NIAID-funded IDCRC. Investigators at the Hope Clinic, Emory University Hospital Midtown, Emory University Hospital, Emory-Children's Center, and Grady Memorial Hospital are taking part.

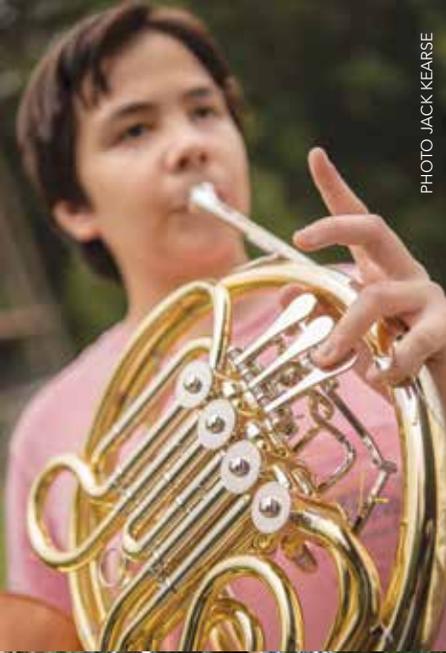


PHOTO JACK KEARSE

◀ “The faster we do this vaccine, the faster the world gets back together.”

—JACK SHAEFFER

Autumn Gilford, 9, participated in the Moderna pediatric vaccine study.



PHOTO JACK KEARSE

“This research is an important test of approaches that could help us manage SARS-CoV-2 viral variants and possibly provide flexible immunity.” ▶

—NADINE ROUPHAEL



PHOTO JACK KEARSE



So far, COVID-19 vaccines appear to be safe in these populations. The NIAID study will build on these studies by improving researchers' understanding of antibody responses to COVID-19 vaccines among pregnant and postpartum women and the transfer of antibodies to their infants.

"It is critical that we better understand both the maternal immune response to COVID-19 vaccinations in pregnancy and antibody transfer to babies via the placenta and breast milk," says Emory principal investigator Martina Badell, associate professor of gynecology and obstetrics in the SOM. "Additionally, this large study will allow us to systematically study the safety of these vaccines in the special population of pregnant patients and their infants."

LONG COVID

Of the more than 80.5 million COVID-19 cases in the US, it is estimated that between 10 percent and 30 percent are what are known as long-haulers.

Through NIH funding, Emory, Morehouse School of Medicine, the Atlanta Veterans Affairs Healthcare System,

and Kaiser Permanente of Georgia will receive close to \$20 million to be part of an initiative called Researching COVID to Enhance Recovery (RECOVER). The consortium brings together scientists, clinicians, patients, and caregivers to take on a critical problem: recovery from the long-term effects of COVID-19.

The RECOVER research team will identify the risk factors that contribute to long COVID—medically known as post-acute sequelae of SARS-CoV-2 infection (PASC)—which can affect multiple organs.

Igho Ofotokun, professor of medicine at the SOM and one of three principal investigators for the study in Atlanta, cites Emory's longstanding leadership in tackling emerging infectious diseases and their consequences, or sequelae. "Survivors of COVID-19 who are experiencing long COVID symptoms deserve answers and relief from their symptoms," he says.

Close to 1,000 people will be recruited for the study in Atlanta. In all, tens of thousands of participants will be recruited from more than 200 sites around the country.



PHOTO STEPHEN NOWLAND



PHOTO JACK KEARSE

Emory’s Northlake Mall Vaccine Clinic was one of the first large-scale vaccine clinics in Georgia. The Emory team advised federal, state, and local officials as well as private entities on best practices.

POST-COVID-19 CLINICS

Long COVID sufferers can receive specialized care through Emory. These post-COVID-19 clinics provide follow-up care for people who have recovered from their acute illnesses yet continue to experience persistent symptoms such

as shortness of breath, chronic pain, dizziness, and neuromuscular weakness.

The doctors coordinating the post-COVID-19 clinics are pulmonologists or family medicine physicians; however, they are gathering a diverse group of specialists including cardiologists, neurologists, psychiatrists, rheumatologists, otolaryngologists, and rehabilitation specialists.

The Emory research team is investigating what factors may contribute to the risk of developing long COVID. They are collecting blood samples from post-COVID-19 patients and conducting detailed interviews and neurocognitive tests to assess symptoms.

LESSONS LEARNED FROM MISSTEPS IN THE GLOBAL RESPONSE TO COVID-19

With the United States leading the world in COVID-19 deaths and cases, scientists and public health experts at Emory say the pandemic is a “clarion call” to examine ways to bolster and modernize systems that support and guide science, technology, and public health in the country.

Writing in the medical journal *JAMA*, Venkat Narayan, James Curran, and William Foege say the national crisis has

“exposed critical weaknesses” in the institutional systems intended to protect and promote personal and public health. Narayan is the Ruth and O. C. Hubert professor of global health at Rollins School of Public Health; Curran was the dean at Rollins for 27 years before stepping down on July 1, 2022; and Foege is emeritus presidential distinguished professor there.

The current moment presents an opportunity to think boldly about a better future and ensure that federal institutions remain effective guardians of public health. As they note, “This will require significant changes to the governance structures of the public health institutions and rebuilding of public trust in science and public health.”

FROM DISCOVERY TO REAL-WORLD APPLICATION

“It begins with science—understanding human biology, understanding disease, how disease affects us. But science alone doesn’t cure disease; this is why Emory is so special as a university,” says Emory President Gregory L. Fennes.

He is referring to the capacities Emory has through DRIVE, a nonprofit owned by the university that focuses on the discovery and development of antiviral drugs for emerging infections, pandemic threats, and biodefense.

“One of the things I’m interested in doing, as we look to the future, is how do we make that model work even better, so that we can really serve our mission to help humanity through scientific advances and developments like molnupiravir,” Fennes adds.

All the components of Woodruff Health Sciences Center have **hired diversity, equity, and inclusion officers** and developed DEI strategic plans and initiatives.

THE COVID-19 PANDEMIC ELEVATED A LONGSTANDING PROBLEM in America's health care system—namely, the disproportionate impact suffered by underrepresented groups. Even institutions that strive to achieve social justice and equity recognized the need to do more. The Woodruff Health Sciences Center (WHSC) is no exception.

During the past year, the WHSC has redoubled its efforts to address diversity, equity, and inclusion (DEI) internally as well as in Emory's curricula, research, and community outreach.

"Diversity, equity, and inclusion is one of our core values and the crucial foundation of a constructive culture," says Jonathan S. Lewin, executive vice president for health affairs, executive director of the WHSC, and CEO and chair of the board of Emory Healthcare.

"Diversity is about recognizing and valuing the many ways in which people differ from one another, the perspectives and life experiences that make each of us unique. We define equity as creating a fair playing field in which every team member and patient has equal opportunity to succeed and/or attain their full health potential regardless of who they are. It's about building equitable access, processes, and systems and eliminating disparities," Lewin says.

GETTING OUR OWN HOUSE IN ORDER

Emory Healthcare, the School of Medicine (SOM), the

Rollins School of Public Health (RSPH), and the Nell Hodgson Woodruff School of Nursing (SON) have all hired DEI officers and developed DEI strategic plans and initiatives. These plans prioritize increasing diversity among faculty, staff, and students; adding cultural humility and antibias training for faculty, staff, and students; and embedding the connection between social determinants of health and racial injustice into the curriculum.

A racism and social justice webinar series in the SOM explored bias in clinical decision making, inclusive leadership, microaggressions under the microscope, and being an authentic ally. "Enriched by these sessions, we then gathered all the information needed to guide priority setting," says Natalie Fields, director of faculty advancement and inclusion. "We also studied DEI programs already operating in the medical school so we could build on what works."

The result is the Actionable Education Initiative. Its goals are twofold: to move the SOM community from awareness of internal biases and external forces of marginalization and oppression to learning about their origins and repercussions and then growing into antiracist allies actively working for change.

The SON launched an initiative focusing on social justice education and inclusive excellence—DiversityEdu. Three online courses serve as a foundational learning tool examining concepts relative to microaggressions,

**"As human beings,
we want to feel that
we belong, and we
want to be treated
with dignity."**

—Tené Lewis



“We define equity as creating a fair playing field in which every team member and patient has equal opportunity to succeed and/or attain their full health potential regardless of who they are.”

—JONATHAN S. LEWIN

bystander intervention, and strategies that enable individuals to engage when diversity challenges arise. With the unwavering support of Dean Linda McCauley and her leadership council, 97 percent of faculty and 99 percent of staff completed the suite of DiversityEdu courses.

RSPH is in the process of revising its three school-level foundational courses that all master's students must complete to understand the racist roots of health inequities deeply embedded in our society, along with the disproportionate impact of morbidity and mortality in global communities of color. One new course, Addressing Racism as a Public Health Issue to Promote Health Equity, filled up almost as soon as it was posted and continues to have a waiting list. "I want to not only give students an overview of racism as a driver for health inequities but also to encourage them to think about public health professionals' role in dismantling racism," says Briana Woods-Jaeger, assistant professor in the Department of Behavioral, Social, and Health Education, who teaches the course.

REDUCING DISPARITIES THROUGH DISCOVERY

Researchers across public health, nursing, and medicine are delving into the upstream contributors to the poor health outcomes of minority populations. "For too long, investigators have examined race and health as we would obesity or smoking," says Lauren McCullough, assistant professor of epidemiology at RSPH. "But it's a social construct that comes with so much history. To truly understand why Blacks have such poor health outcomes, we really have to pull back the layers to look at the structural and systemic underpinnings of the Black condition in the US."

Here are a few examples of research into the causes of, and solutions for, persistent health disparities.

Black mothers die at three times the rate of White and Latina mothers, making maternal mortality one of the widest racial disparities in women's health. Alexis Dunn-Amore, a nurse-scientist in the SON and a certified midwife, says the reasons why so many Black women perish in the postpartum period are varied and complex: poverty; untreated chronic conditions; acute depression

and mood disorders; a lack of access to health care, especially in rural areas; an absence of education about warning signs; systemic racism and bias; and a long history of mistrust and skepticism between provider and patient. Dunn-Amore is currently building a web-based platform that uses a list of CDC indicators that typically precede maternal death so women can triage their symptoms.

According to geriatrics physician Monica Parker, people of color are nearly twice as likely as their White counterparts to develop some form of dementia. However, Blacks are consistently underrepresented in Alzheimer's studies. For the past eight years, Parker has worked to foster relationships with Atlanta's Black churches and historically Black sororities. A chief goal: persuading Blacks to enroll in Emory's Registry for Remembrance, which educates them about the disease and recruits them for long-term studies.

Thanks to Parker's efforts, people are listening and, more important, they are telling their friends. The community educational sessions she hosts at The Carter Center have already outgrown their original space, as hundreds of aging residents sign up to attend. "Our meetings have mushroomed," she says. "We're seeing a lot more community participation in our research projects. It's critically important data for us."

RSPH researcher Tené Lewis—in collaboration with cardiologists, rheumatologists, and neurologists—has documented how stress stemming from discrimination results in elevated levels of coronary artery calcification, visceral fat, and C-reactive protein. All these factors increase the risk of strokes and heart attacks. Her studies consistently showed that discriminatory stress produced worse outcomes in physical health than other stressors, including financial, traumatic, and interpersonal stress.

Compounding the injury, Lewis and others found that strategies that can typically ameliorate the health effects of other types of stress—social support and coping skills—do not lessen impacts of discriminatory stress. She suspects the reason is that, unlike any other stressor, discrimination is pervasive and lifelong. "As human beings, we want to feel that we belong, and we want to be treated



WHSC is committed to promoting diversity, equity, and inclusion.



PHOTO JACK KEARSE



PHOTO JACK KEARSE



PHOTO JACK KEARSE

with dignity,” she says. “Experiencing large and small indignities over the course of your lifetime is cumulative and results in worse disease, more physical health symptoms, more physiological dysregulation, and on and on.”

Lewis has moved on to parse out physical reactions to different types of discriminatory experiences. In one study, she is looking at the physical effects of vigilance, which refers to the threatened state in which many Black Americans exist in their day-to-day lives. “If you are aware that the sales clerks may follow you around in a store, or that you may end up handcuffed at a routine traffic stop, you walk around on high alert,” says Lewis. “Our preliminary results show the more vigilant you are, the more carotid atherosclerosis you have.”

COMMUNITY OUTREACH

Emory’s DEI efforts don’t end at the campus boundaries. Programs and initiatives reach out into the surrounding community.

The Emory Pipeline Collaborative provides students from disadvantaged backgrounds with pathways to health sciences careers. High school students enjoy three years of college preparation and health-career exploration to help them go to college. Activities include after-school sessions and a summer program. Seniors participate in a health professions and clinical experience program. Those who matriculate to Emory receive scholarships and other benefits.

The Hatchery, an Emory center for innovation, awards Inspiration Micro-Grants to a select group of Emory scholars who spend their summers tackling complex societal issues including homelessness, human trafficking, and health care inequality. One successful program developed from the micro-grant program is Art for Heart, a nonprofit founded by grantee Yifei Gao. It combines artistic expression with activism and is dedicated to raising awareness—and funds—for a variety of political and social issues, including erasing inequality in access to the arts.

RSPH students launched the Dignity Pack Project to supply people experiencing homelessness in Atlanta with basic hygiene items, menstruation supplies, condoms, and personal protective equipment. The students used grant money and in-kind and cash donations to obtain the supplies. Distribution typically happens at places where partner organizations such as SafeHouse Outreach are serving food to Atlanta’s homeless population. The Dignity Pack Project team sets up a table nearby. Product kits are not prepackaged so that people can select items depending on their preferences and needs.

“When we talk about our responsibility as public health practitioners, this is an example of where a basic survival need is not being met,” says Alison Hoover, one of the students who ran the project. “The Dignity Pack Project recognizes that people have basic needs for their survival and dignity and focuses on that.”

Emory Healthcare's workforce continues to garner **top honors for outstanding patient care.**

THE PANDEMIC HAS BOLDLY UNDERSCORED THE IMPORTANCE OF A STRONG HEALTH CARE WORKFORCE—strong both in quality and quantity. Emory Healthcare and the Schools of Medicine and Nursing are addressing both areas.

For decades, there has been a growing deficit of primary care physicians around the country. Georgia's situation is more dire, having a per-capita ratio worse than the nation's average and having been worsened by the pandemic.

To help address this problem, the Emory School of Medicine launched a \$5 million student loan forgiveness program funded from the Amos Family Foundation. Medical students and residents must agree to work in Georgia for a duration commensurate with their financial award. The program will not eradicate students' debt. However, the initiative could reduce the pressure some students feel to pursue more lucrative specialties and practice in metropolitan areas to earn enough money to pay back their loans—leaving a dearth of medical talent in rural areas and lower-paying disciplines.

Nursing shortages also have plagued the country for years, and Emory Healthcare has responded to these critical staffing shortfalls. Along with Chamberlain University, the nation's largest nursing school, Emory Healthcare provided local students onsite opportunities in Emory hospitals to gain insight in a supervised perioperative setting during a pilot program. "Identifying and preparing perioperative nurses in the early stages of their education and career is a proactive approach to supporting quality health care and positive learning experiences for nursing students in the metro Atlanta area," says Sharon Pappas, chief nurse executive for Emory Healthcare.

"We applaud Emory Healthcare . . . for ensuring the best and safest care possible for patients."

—Earl Rogers
CEO and President,
Georgia Hospital
Association

In another effort, the Nell Hodgson Woodruff School of Nursing is creating the Georgia Forensic Nursing Network. Once established, the network will work with partners across the state to increase the number of Sexual Assault Nurse Examiners in Georgia. The network's mission is to engage academic-practice partnerships and stakeholders in a sustainable community of forensic nursing practice throughout Georgia and to improve health care for survivors of sexual violence.

Emory Healthcare is collaborating with ProMedica, the nation's largest not-for-profit post-hospital care provider, to design and build two multimillion-dollar skilled nursing and rehabilitation centers in the metro Atlanta area. By leveraging their respective skills and expertise, ProMedica and Emory Healthcare are uniquely positioned to improve health care connectivity and access to resources

that help patients transition between hospital and home in the Atlanta area.

ACCOLADES FOR THE HOME TEAM

Emory Healthcare's own workforce continues to garner top honors for outstanding patient care. The Georgia Hospital Association (GHA) Partnership for Health and Accountability presented eight of its prestigious Patient Safety and Quality Awards to Emory Healthcare and three Emory Healthcare hospitals: Emory University Hospital Midtown, Emory Saint Joseph's Hospital, and Emory University Orthopaedics & Spine Hospital. In the words of GHA President and CEO Earl Rogers, "We applaud Emory Healthcare . . . for ensuring the best and safest care possible to patients."

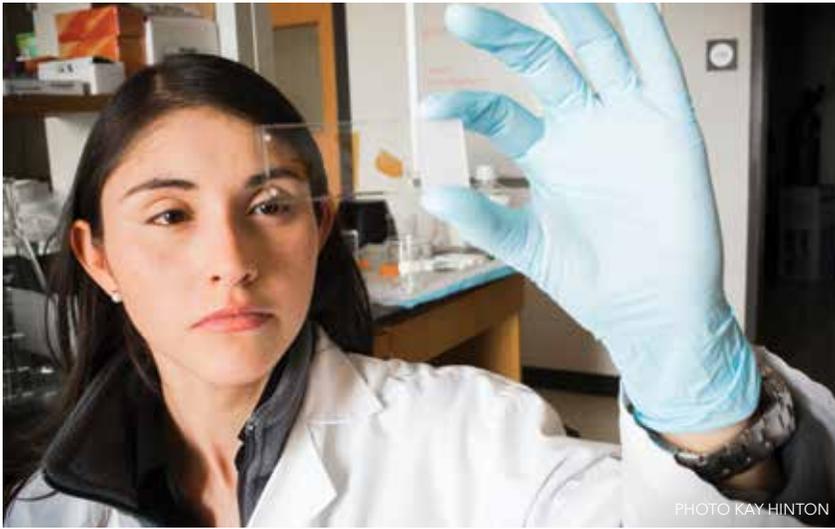


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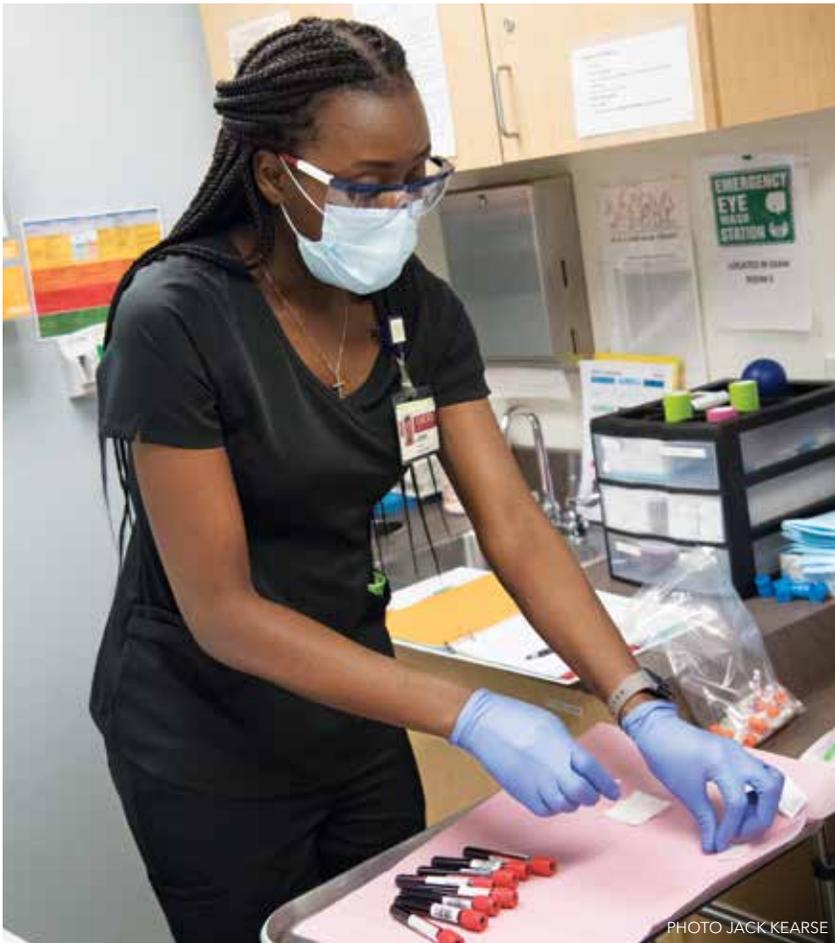


PHOTO JACK KEARSE



PHOTO JACK KEARSE

The Magnet Recognition Program—administered by the American Nurses Credentialing Center, the largest and most prominent nurses’ credentialing organization in the world—identifies health care organizations that provide the very best in nursing care and professionalism in nursing practice. It serves as the gold standard for nursing excellence and provides consumers with the ultimate benchmark for measuring the quality of care.

Emory Healthcare is the only health system in Georgia with four Magnet-designated hospitals—Emory Johns Creek Hospital, Emory Saint Joseph’s Hospital, Emory University Hospital, and Emory University Orthopaedics & Spine Hospital. Roberta Kaplow, clinical nurse specialist in the Acute Respiratory Intensive Care Unit at Emory University Hospital, was named a 2020 National Magnet Nurse of the Year.

The Woodruff Health Sciences Center invested **\$152 million** in research costs unrecovered from sponsors in FY2020–2021.

IN FY2020-2021, RESEARCHERS IN THE HEALTH SCIENCES WERE AWARDED \$847 MILLION IN GRANTS FROM THE NIH AND OTHER ORGANIZATIONS.

“Our ongoing spectacular growth accentuates Emory’s reputation as a research powerhouse and, despite the challenges of a global pandemic, underscores our commitment to improving human health through discovery and innovation,” says Jonathan S. Lewin, executive vice president for health affairs, executive director of the WHSC, and CEO and chair of the board of Emory Healthcare.

As he launched Emory’s 2036 campaign in fall 2021, President Gregory L. Fenves looked forward to where the university will be in 15 years, saying, “At its bicentennial in 2036, Emory will be a research university without equal.”

Following is a sampling of significant research conducted at Emory during the past year.

BUILDING CARDIAC CELLS IN SPACE

Researchers at Emory’s School of Medicine (SOM) and Children’s Healthcare of Atlanta (CHOA) teamed up with NASA to send stem cells into space aboard the SpaceX-20 mission. In just three weeks, the stem cells became beating cardiac cells.

Before launching the stem cells, SOM and CHOA scientists had been using space-simulation machines to enhance the ability of immature stem cells to turn into cardiac muscle cells. The goal was to determine the effects of zero-gravity conditions on stem cells and to optimize the generation of clinically relevant cardiac muscle cells on Earth.

Stem cell-derived cardiac muscle cells have been used to treat heart failure in animal models. These cells have the potential to treat heart disease in kids and adults, but

repairing a damaged heart requires a large number of heart cells,” says Chunhui Xu, an associate professor in the SOM who is the study’s principal investigator. “We were hoping to identify a more effective way to generate these cells by exploring the use of microgravity.”

ZEROING IN ON A MOSQUITO MENACE

Mosquitoes are often called humanity’s deadliest predator, given they transmit pathogens that have killed billions of people throughout history. These pervasive insects continue to spread pathogens that kill more than 800,000 people annually and cause many more to suffer debilitating illnesses—mostly in the developing world.

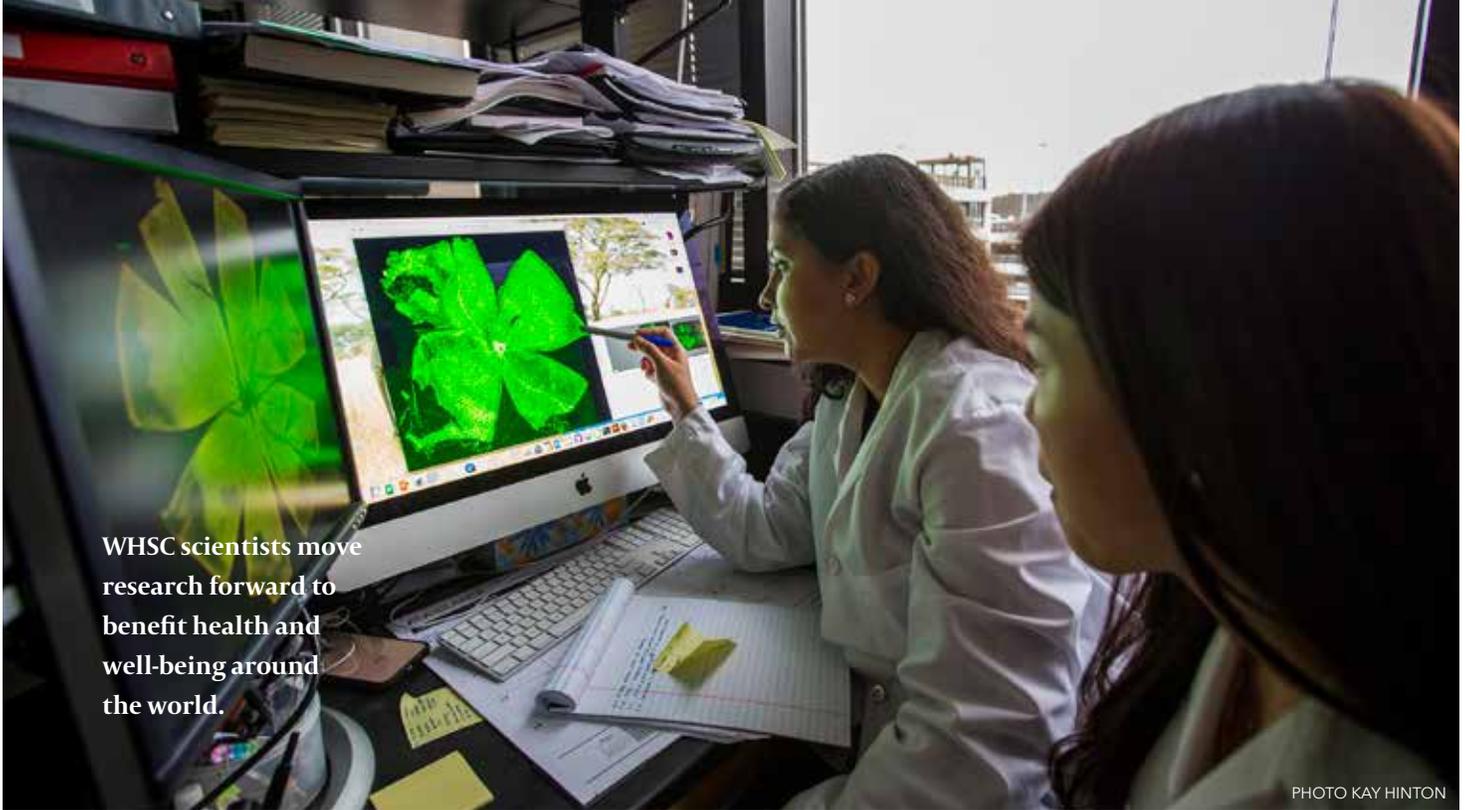
Emory scientists are leading a new strategy in humanity’s long-running war with the mosquito, using big data to target one species of this tiny disease vector. They have studied the behavior of the *Aedes aegypti* mosquito, pinpointing where it hangs out in homes. They are mapping cases over time of viral infections that this species can transmit when it bites a human—including dengue fever, Zika, chikungunya, and yellow fever. They are focusing on high-risk neighborhoods for outbreaks of these diseases in sprawling

urban areas of the tropics.

“We’re working on some of the boldest and biggest changes in decades for the surveillance and control of this mosquito,” says Gonzalo Vazquez-Prokopec, an Emory disease ecologist. “The time is right to embrace the full complexity of mosquito control and disease-transmission dynamics. We now have good baseline data, and the necessary computer power, to develop more complex models to help contain outbreaks.”

“At its bicentennial in 2036, Emory will be a research university without equal.”

—President
Gregory L. Fenves



WHSC scientists move research forward to benefit health and well-being around the world.

PHOTO KAY HINTON

SEARCHING FOR A CURE FOR HIV

An Emory-led research collaboration is fast-tracking studies to cure HIV infection or put it in permanent remission. In one of 10 NIH-funded Martin Delaney Collaboratories for HIV Cure, scientists from Emory and the Emory National Primate Research Center are working to characterize the key immune system functions that control persistent HIV infection and to design innovative, immune-based therapies to eliminate or control the virus in the absence of antiretroviral therapy.

“It’s been 40 years since the first case of what we now know as HIV/AIDS was reported in the United States,” says Mirko Paiardini, one of the leaders of the study. “Our work and the work of the others will bring us closer to a cure, a goal now regarded as possible based on recent research advancements and the continuing dedication of HIV/AIDS researchers and advocates.”

Emory and Emory National Primate Research Center researchers play leading roles in three other Martin Delaney Collaboratories:

- Emory and Johns Hopkins University are co-leading an initiative focusing on curing pediatric HIV.
- Working with the University of North Carolina at Chapel Hill, Emory researchers are seeking to better understand persistent HIV infection and discover novel approaches to disrupt HIV latency, methods to clear the HIV reservoir, and strategies to control viral rebound.

- Emory is working with Sanford Burnham Prebys Medical Discovery Institute, a nonprofit research institute, more than 10 other academic institutions, and Merck Research Laboratories to understand the molecular and cellular basis for the loss of immune stability and function in people infected with HIV. The research team will harness this information to create treatment options, enhance viral reactivation and elimination strategies, and evaluate effectiveness in nonhuman primate models.

USING AI TO TREAT PARALYSIS

A jointly appointed researcher at Emory and Georgia Institute of Technology is using artificial intelligence to build brain-machine interfaces to assist people with paralysis, specifically those with amyotrophic lateral sclerosis (ALS). For this innovative work, Chethan Pandarinath received the NIH 2021 Director’s New Innovator Award.

His team will implant sensors into the brains of paralyzed people with ALS. The sensors will use algorithms to help read complex nervous system signals that control movement and decode what the brain is telling the body to do in a matter of milliseconds. The goal of the five-year project will be to restore communication, hand function, and speech in the trial participants.

The long-term goal is to reconnect the brain and the body for patients who are also paralyzed from strokes, spinal cord injuries, or other serious neurological disorders.

WHSC invested **26 percent** of its \$755 million tuition income last year in **student financial aid**.

THE THREE SCHOOLS IN THE WOODRUFF HEALTH SCIENCES CENTER (WHSC) WORK CONTINUALLY TO ADAPT TO CURRENT AND FUTURE NEEDS IN THE HEALTH PROFESSIONS.

For example, WHSC recently established the Office of Interprofessional Education and Collaborative Practice (IPECP). The office will foster collaboration among interprofessional, interdisciplinary teams working seamlessly across education, research, and clinical care to treat and prevent disease.

“The Atlanta metropolitan area is highly diverse and rapidly growing, and much of this population relies on the education, research, and clinical care provided by the units of the WHSC,” says Jonathan S. Lewin, Emory’s executive vice president for health affairs, executive director of the WHSC, and CEO and chair of the board of Emory Healthcare. “The Office of IPECP will harness the collective talents of our clinicians, faculty, and researchers in order to augment interprofessional education, training, and collaboration so that we continue to provide the latest medical advancements, care models, and treatment to those we serve.”

The Nell Hodgson Woodruff School of Nursing opened the Emory Nursing Learning Center (ENLC), an innovative new facility designed to anticipate challenges in nursing education and embrace innovative technologies and advanced teaching methods. Nursing students of all levels—from undergraduates, to doctoral candidates, to working professionals—within the Emory Healthcare system can take advantage of a host of state-of-the-art learning environments: an expanded, cutting-edge simulation and skills lab, new telehealth and remote-learning facilities, an Innovation Hub, and even a “home” lab that replicates a small apartment.

“The ENLC is Emory’s first step in taking nursing education into the 21st century,” says School of Nursing Dean Linda McCauley. “The new simulation center will be the largest of its kind in Georgia and will allow us to share our facilities, equipment, and programs with others across the state who need advanced training.”

The Rollins School of Public Health is launching a new certificate program to train students for careers in climate change and health. The certificate follows the establishment of the new Emory Climate and Health Research Incubator at Rollins to foster new research that can improve society’s response to climate change. “Climate change is one of the defining challenges of the century,”

said former Rollins Dean James W. Curran, “and it is essential that we offer our students opportunities to develop the skills they will need to be leaders in this field.”

The School of Medicine is reimagining and transforming its curricula to ensure it is keeping up with the demands on clinicians and scientists to solve current and future health challenges.

“The guiding principles and practices that have moved our institution toward eminence in research and clinical care must also extend to the student experience—including compassion, creativity, innovation, community engagement, data-driven problem solving, a commitment to diversity and inclusion, and a focus on building connections across disciplines,” says School of Medicine Dean Vikas Sukhatme. “Our graduates will continue to be excellent clinicians and scientists, but in today’s environment they must also be able to lead change across health systems and communities.”

Emory Healthcare provided \$66 million to support teaching and research in the WHSC in FY2020–2021.

“The new simulation center will be the largest of its kind in Georgia.”

—Dean Linda McCauley
School of Nursing



PHOTO JACK KEARSE

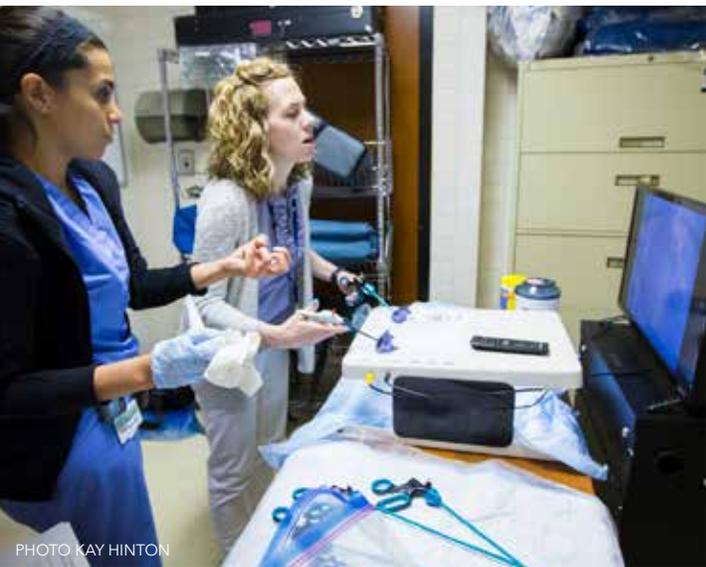


PHOTO KAY HINTON



PHOTO KAY HINTON

“Our graduates will continue to be excellent clinicians and scientists, but in today’s environment they must also be able to lead change across health systems and communities.”

—DEAN VIKAS SUKHATME, EMORY SCHOOL OF MEDICINE

FROM THE EXECUTIVE VICE PRESIDENT



Jonathan S. Lewin, MD

Executive Vice President for Health Affairs, Emory University

Executive Director, Woodruff Health Sciences Center

CEO and Chair of the Board, Emory Healthcare

Courage to care

Being sick or injured is a physical, emotional, and spiritual challenge for anyone, often requiring great depths of courage and fortitude to overcome. That's where the caring people of Emory's Woodruff Health Sciences Center step in, providing help and hope to people in their most critical hour of need.

The interaction of these two groups—people facing their darkest hours and the profession-

als who are so committed to helping them—leads to the inspirational accounts of hope and progress in this report. The stories, which represent just a few examples among thousands each year, are about people facing hardship with extraordinary courage and the people who provide them extraordinary care.

Courage to Care is an especially bittersweet report for me, as it will be my last as the leader of Emory's Woodruff Health Sciences Center. Taking part in this heartwarming annual reflection of our dedicated team and the people they serve is always one of the highlights of the year for me. It's truly humbling to be involved in something so meaningful. I cannot overstate what an incredible privilege it has been to lead this team, and I am proud of all that the organization has done during my time at Emory, as reflected in this wonderful publication.

Finally, I must acknowledge the stellar communications professionals who work so diligently to document these stories and to share them with the Emory community and beyond. The writers, editors, graphic designers, and other members of our Health Sciences communications team bring not only first-class talent to the development of this report but also a deep appreciation and understanding of the real reason we're all here—to improve lives and provide hope. My sincere thanks to all.

Woodruff Health Sciences Center of Emory University

Office of the Executive Vice President for Health Affairs

Emory University School of Medicine

Nell Hodgson Woodruff School of Nursing

Rollins School of Public Health

Emory National Primate Research Center

Winship Cancer Institute of Emory University

Emory Global Health Institute

Emory Healthcare, the most comprehensive health care system in Georgia

- Emory University Hospital, 791 beds, including 82 at Wesley Woods
- Emory University Hospital Midtown, 550 beds
- Emory University Orthopaedics & Spine Hospital, 120 beds
- Emory Rehabilitation Hospital, in partnership with Select Medical, 66 beds
- Emory Saint Joseph's Hospital, 410 beds
- Emory Johns Creek Hospital, 144 beds
- Emory Decatur Hospital, 451 beds
- Emory Hillandale Hospital, 100 beds
- Emory Long-Term Acute Care, 76 beds
- Emory University Hospital Smyrna, 88 beds
- Emory Clinic, 3,081 physicians, nurse practitioners, physician assistants, and other providers, with offices throughout the city and state
- Emory Specialty Associates, an outreach physician group practice organization with locations throughout the city and state
- Emory Wesley Woods Campus (includes Emory University Hospital at Wesley Woods, Wesley Woods Towers residential and personal care apartments, and Budd Terrace, a 250-bed skilled-nursing care facility)
- Emory Healthcare Network, a network of physicians and hospitals formed to improve care coordination and quality outcomes and to control costs for patients and the community

HOSPITAL AFFILIATES

- Grady Memorial Hospital, 953 licensed beds, staffed by 843 Emory faculty and 376 residents and fellows, in collaboration with Morehouse School of Medicine, with Emory providing 80% of care
- Children's Healthcare of Atlanta
 - Children's at Egleston, 330 beds, Emory campus, staffed by Emory and private practice physicians
 - Children's at Hughes Spalding, 24 beds, Grady Hospital campus, staffed by Emory, Morehouse, and private practice physicians
 - Children's at Scottish Rite, 319 beds, staffed by Emory and private practice physicians
- Atlanta Veterans Affairs Medical Center, 363 authorized inpatient hospital beds, including a 42-bed community living center, a 61-bed domiciliary, and 88 psychiatry beds. Staffed by 299 Emory physicians, with 650 resident rotations each academic year.

COVID-19 CENSUS

(for calendar year 2021)

NUMBER OF ADMITTED COVID-19 PATIENTS—**8,593**

NUMBER OF PATIENTS NEEDING ICU CARE—**1,871**

NUMBER OF SUCCESSFULLY DISCHARGED PATIENTS—**7,990**

NUMBER OF BEDS USED DURING COVID-19 PEAKS—**499**

TRAVELING HEALTH CARE WORKERS WHO HAD TO BE BROUGHT IN—**2,601**

VALUE OF UNREIMBURSED CARE FOR COVID-19 PATIENTS UNDER THE HRSA UNINSURED PROGRAM—**\$32 MILLION**

COVID-19 RESEARCH FUNDING—**\$111 MILLION**

QUICK STATS

HOSPITAL CAMPUSES—**11**
OUTPATIENT LOCATIONS—**135**
INPATIENT BEDS—**2,796**
PHYSICIANS—**3,379**
EMPLOYEES—**31,558**
STUDENTS + TRAINEES—**5,950**

VALUE TO THE COMMUNITY

Emory's Woodruff Health Sciences Center benefited the community in a variety of ways in FY2020–2021.

COST OF CHARITY CARE PROVIDED BY EMORY HEALTHCARE	\$125 MILLION*
FINANCIAL AID PROVIDED TO STUDENTS FROM TUITION INCOME	\$40 MILLION
EMORY HEALTHCARE INVESTMENT IN WHSC TEACHING AND RESEARCH	\$66 MILLION
WHSC INVESTMENT IN RESEARCH UNRECOVERED FROM SPONSORS	\$152 MILLION
UNREIMBURSED CARE PROVIDED AT GRADY HOSPITAL	\$33 MILLION
INVESTMENT OF EMORY MEDICAL CARE FOUNDATION SERVICES AT GRADY HOSPITAL	\$58 MILLION
OTHER COMMUNITY BENEFITS	\$214 MILLION†
TOTAL	\$688 MILLION

**In addition to providing charity care, Emory Healthcare conducts ongoing community health needs assessments (CHNAs) for its hospitals as part of its continued commitment to the health and well-being of community members. The reports assess the needs of the communities served by the hospitals using quantitative data and input from individuals representing the broad interest of the communities. Using the CHNAs, Emory Healthcare develops strategies to outline plans to address the identified health needs of the communities it serves. Through these strategies, Emory Healthcare strives to improve the overall health of communities while providing the best possible care to its patients.*

†This includes the following:

*Costs to Emory Healthcare for the Georgia provider tax, which supports the Medicaid budget and helps maintain payment levels for all Medicaid providers—\$41 million
Shortfall between Emory Healthcare's cost to provide care to Medicaid patients and Medicaid reimbursement—\$162 million
Discounted/free prescription drug programs; programs and contracted services for indigent patients; in-kind donations to organizations such as MedShare; transportation services; flu shots; blood drives; subsidized continuing care, nursing home care, and home care; sponsorship of selected charity health awareness events; and educational programs for the public, future health professionals, and patients—\$11 million*

Based on expenditures of \$6.3 billion in FY2020–2021, the WHSC has an estimated economic impact on the metro area of \$12 billion.



EMORY

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SCIENCES
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Emory is dedicated to sustaining the environment. After you've read this publication, please share it with a friend or recycle. Thank you.

Emory discovered one of the first oral antivirals approved for emergency use authorization for COVID-19.

