



Exemplary Service *in* Extraordinary Times

COMMUNITY BENEFITS REPORT | 2020



EMORY

WOODRUFF
HEALTH
SCIENCES
CENTER



INSIDE

- 2 A leader in COVID-19 research
- 8 Providing care
- 12 Serving the underserved
- 15 Cutting through the chaos
- 16 Helping the state and counties respond
- 18 Beyond COVID-19
- 20 A message from the executive director
Woodruff Health Sciences Center

Woodruff Health Sciences Center components
- 21 COVID-19 census
Value to the community

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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: Molly McAlvany, a second-year epidemiology student at Rollins School of Public Health, was part of a rapid-response team that tested poultry workers for COVID-19 in Hall County last summer.

IN SHORT

In 2020, the value of Emory Healthcare's unreimbursed care for COVID-19 patients under the HRSA uninsured program totaled

\$56 million

“Together, we are improving lives and providing hope in these times of global uncertainty. **The people of Atlanta, Georgia, the nation, and the world will continue to benefit from Emory innovations in science and clinical care.**”

—JONATHAN S. LEWIN

Executive Vice President for Health Affairs;
Executive Director, Woodruff Health Sciences Center;
CEO and Chair of the Board, Emory Healthcare

EMORY WAS ONE OF TWO TESTING SITES FOR THE FIRST COVID-19 VACCINE DEVELOPED IN THE US.

\$783 million

Total research funding in the Woodruff Health Sciences Center in FY2019–2020, reflecting 94.2 percent of the \$831.2 million awarded to the university

Emory ranks **No. 3 nationwide** in NIH awards for COVID-19 among universities

“Unprecedented.”

“Once-in-a-century.”

“The new normal.”

All of us sought refuge in these phrases as a novel virus swept across the globe. In the space of a year, COVID-19 deaths worldwide have topped two million, with the United States ranking first on a per-country basis.

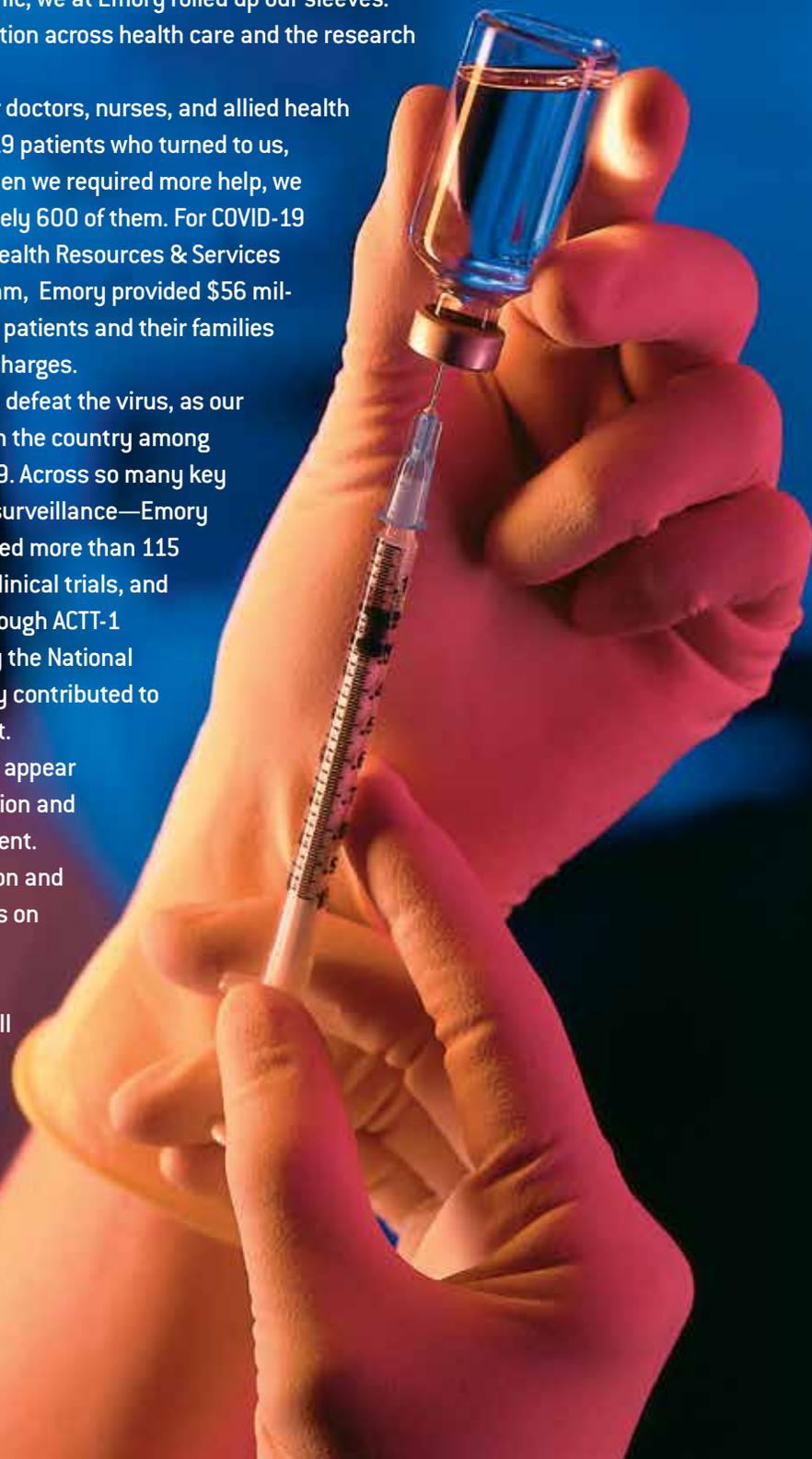
As the first cases spiraled into a global pandemic, we at Emory rolled up our sleeves. Relying on our deep well of experience and innovation across health care and the research enterprise, we resolved to do what we do best.

Unparalleled patient care. Nearly 4,000 of our doctors, nurses, and allied health professionals rushed to care for the 7,423 COVID-19 patients who turned to us, nearly 2,000 of whom required intensive care. When we required more help, we brought in other health care workers—approximately 600 of them. For COVID-19 patients who could not pay and qualified for the Health Resources & Services Administration (HRSA) COVID-19 Uninsured Program, Emory provided \$56 million in unreimbursed care. And we celebrated with patients and their families when we were able to make 6,833 successful discharges.

Nimble research. We lost no time in working to defeat the virus, as our level of grant support attests: Emory ranks third in the country among universities earning NIH funding to battle COVID-19. Across so many key categories—testing, therapeutics, vaccines, and surveillance—Emory has led. In just a year, Emory investigators launched more than 115 research projects and studies, including several clinical trials, and published more than 580 papers on COVID-19. Through ACTT-1 (Adaptive COVID-19 Treatment Trial), sponsored by the National Institute of Allergy and Infectious Diseases, Emory contributed to a national standard of care for COVID-19 treatment.

Our vaccine and infectious disease specialists appear regularly in the media, helping dispel misinformation and explain the science behind prevention and treatment. In recruitment for clinical trials as well as education and testing outreach efforts, Emory continues to focus on underserved communities of color.

Through Emory’s unstinting efforts in these areas, more patients have recovered and fewer will be sickened. We have brought hope in a dark time in ways that are—yes—unprecedented.



A leader in COVID-19 research

Within weeks after the pandemic began, Emory researchers across a wide variety of disciplines mobilized their resources and applied their expertise to address various dimensions of COVID-19, some pivoting from existing research to redirect their energies and skills to ending the relentless onslaught of a new virus.

At the close of 2020, Emory investigators had launched more than 115 research projects and studies, including several clinical trials, and published more than 580 papers on COVID-19. The university had earned more than \$130 million in COVID-19 research funding, ranking it third in the nation—a testament to the ability of researchers to shift course rapidly to tackle the world's biggest public health crisis in more than 100 years.

“In my short time at Emory, I’ve been deeply impressed by the dedication of our researchers and clinicians, whose cutting-edge discoveries are opening new pathways of understanding in the prevention and treatment of COVID-19,” says Emory President Gregory L. Fennes.

The intricate tapestry of COVID-19 activities spans the spectrum of disease—from advancing understanding of the virus to coming up with quicker and more accurate tests to finding treatments and a vaccine. Here’s a small sample of the wide-ranging COVID-19 research at Emory.

VACCINES

Emory was one of two testing sites for the first COVID-19 vaccine developed in the United States. The vaccine, developed by the National Institute of Allergy and Infectious Diseases and the biotech firm Moderna, was found to be safe and effective and later progressed to advanced-stage trials. In December, it became the second vaccine after Pfizer’s to be issued an emergency-use authorization (EUA) by the US Food and Drug Administration (FDA). Emory Healthcare began vaccinating its front-line health care workers roughly a week after the first EUA had been issued. Both the Moderna and Pfizer vaccines require two doses.

Emory also has been involved in advanced-stage clinical trials of two other vaccine candidates, Novavax and Johnson & Johnson. The latter is the only one-dose vaccine with emergency-use authorization.

A key objective for vaccine trials nationwide was to ensure adequate representation among racial minorities. For the Moderna trial, Emory’s Hope

Clinic recruited the second-highest number of African Americans in the country. At two of the three Emory testing sites for that vaccine, the participation rate averaged around 40 percent for Black and Latinx communities, higher than the reported national average of 30 percent for that trial.

Emory researchers led by Rama Amara are also working on their own vaccine, drawing from their extensive research on an MVA vaccine for HIV/AIDS. MVA is a harmless version of a poxvirus with a proven record of promoting long-lasting immune responses. The Emory MVA COVID-19 vaccine has proven safe and effective in mice and monkeys. It is easily adaptable to address disease variants, can be used in combination with existing vaccines to improve their ability to combat variants, and has the potential to be equally effective with a single dose.

In addition, Emory scientists are evaluating novel adjuvants that can help produce more effective vaccines. Adjuvants are stimulants in the vaccine that can significantly accelerate the



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—EMORY PRESIDENT GREGORY L. FENVES



From the earliest days of the pandemic, Emory researchers were in the lab, working to unlock the mysteries of a novel virus. Many drew from the expertise of years spent studying infectious diseases, including other coronaviruses such as SARS and MERS.

OPPOSITE PAGE LEFT-RIGHT: Pharmacy staff check the temperature of the ultra-cold freezer that contains the Pfizer vaccine. Rama Amara leads a team that has developed a promising MVA COVID-19 vaccine.



At the Emory Vaccine Center, researchers are also working on their own vaccine, drawing from their extensive research on an MVA vaccine for HIV.



speed, quantity, and longevity of the body's ability to make virus-neutralizing antibodies. Researchers expect to release their findings in the next couple of months.

Emory researchers have been awarded a contract by the Centers for Disease Control and Prevention (CDC) to characterize the diversity and evolution of SARS-CoV-2 strains circulating in Georgia. Their aim is to understand whether new variants make the virus spread faster or make people sicker than known varieties.

Along with assessing vaccine candidates for safety and protection, Emory scientists are investigating models for optimal COVID-19 vaccine-distribution strategies. This work by public health researchers will help inform both direct protection and herd-immunity benefits of various COVID-19 vaccination approaches.

THERAPEUTICS

Could drugs that have already been approved for a different use be effective against COVID-19? Emory researchers are investigating several drugs that have shown antiviral activity in cell culture for COVID-19 and in animals infected with MERS and SARS—coronaviruses similar to COVID-19. Many of the drugs being tested are already on the market and some are relatively inexpensive.

Two such repurposed drugs—remdesivir and baricitinib—were both tested at Emory as part of federally funded global trials. Antiviral remdesivir, originally developed for Ebola, was the first COVID-19 treatment authorized by the FDA for emergency use. Anti-inflammatory baricitinib has shown faster recovery among hospitalized patients when used in combination with remdesivir. The FDA recently granted an EUA for baricitinib as well.

Studies are underway to gauge whether manufactured versions of infection-fighting antibodies are effective in protecting against and treating COVID-19. Produced in laboratories, these synthetic antibodies are known as monoclonal antibodies (mAB) and require transfusion. Emory is conducting trials to test the effectiveness of several different mAB therapies, alone or in combination with other drugs. Two of these mABs have now received EUAs for treating COVID-19 and are thought to be most useful during the early stages of the illness.

Merck has bought rights to an antiviral compound that was discovered at Emory. EIDD-2801 was invented by Drug Innovation Ventures at Emory, a not-for-profit biotech firm. The agent was effective against previous coronaviruses such as MERS and SARS and is currently in Phase II trials nationwide. An oral therapeutic could reduce

transmission as it is likely to be easier to dispense compared to drugs that require transfusion.

Researchers at Emory have found that nearly all people hospitalized with COVID-19 develop virus-neutralizing antibodies within six days of testing positive. Although most other studies on the topic have focused on the immune response after hospitalization, Emory used its biosafety level-3 laboratories to do the more time-consuming work of studying patients' antibody response during hospitalization. The study's findings have implications for convalescent plasma therapy and vaccine development. Using this research, clinicians are evaluating the use of convalescent plasma with high levels of neutralizing antibodies as a treatment for COVID-19. The FDA has authorized the emergency use of convalescent plasma therapy as an experimental treatment in clinical trials and for critically ill COVID-19 patients.

DIAGNOSTICS, APPS, AND TOOLS

Emory is one of three Atlanta institutions selected to vet the most promising COVID-19 diagnostic technology. Working with their counterparts at Children's Healthcare of Atlanta and Georgia Institute of Technology, Emory researchers are putting the technologies through a competitive, rapid, three-phase selection process



to identify the best candidates for at-home and point-of-care COVID-19 tests. The \$31 million funding for this project is the largest NIH grant Emory has received in a single budgetary year. The FDA recently authorized two of the testing kits that were evaluated at Emory for home use. In February, the Biden administration invested \$231.8 million in Elume, the manufacturer of one of these testing kits, to scale up production. The test can send results to a smartphone within 15 minutes of receiving a sample.

Researchers, to expand the program and reach more underserved communities, have begun a collaboration with the Atlanta Public Schools (APS) and will offer testing in APS schools for students, staff, and parents.

Emory has developed a SARS-CoV-2 antibody test to enhance disease detection. Antibody tests can help answer critical questions such as disease

progression in populations, exposure to the virus, and infection spread. Antibody tests vary in accuracy. Emory's antibody test identifies the exact type of antibody that prevents the COVID-19 virus from entering human cells, which allows physicians to better predict whether someone with a positive antibody test result is likely to be protected from future infection.

Emory experts are also evaluating devices that collect plasma samples from blood droplets—taken by a finger prick—which can be transported safely through the mail/courier to Emory Medical Labs for the Emory antibody test. This innovation would combine point of care testing, which is convenient but less informative than needed, with the rigor of Emory's antibody test.

Emory doctors have collaborated with Vital, a digital platform for the emergency department, on a COVID-19 symptom-checking app

to help reduce the flood of patients to hospitals. C19check.com acts as an easy way to digest expert information and choose the best plan of action. Based on the answers to questions about symptoms, age, and other medical problems, a person is directed to guidance based on CDC guidelines and is placed into one of three categories: high risk (needs immediate medical attention), intermediate risk (can contact their doctor for guidance about how best to manage their illness), or low risk (can most likely administer self-care or recover at home).

SURVEILLANCE, MODELING, AND HEALTH IMPACT

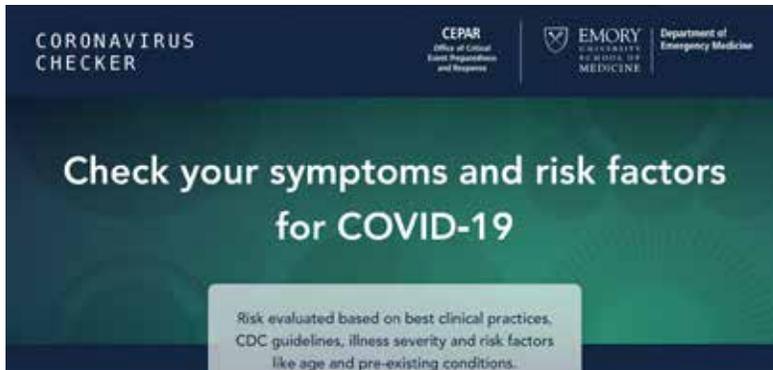
Researchers have built a dynamic and interactive web-based dashboard that displays the interplay between social determinants and COVID-19 epidemiological metrics at the county level. The public-facing dashboard allows anyone



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Emory was one of two testing sites for the Moderna vaccine and has been involved in advanced-stage clinical trials of two other vaccine candidates, Novavax and Johnson & Johnson. Emory has recruited among the highest number of African Americans in these trials.

Emory doctors assisted in developing a COVID-19 symptom-checking app to help reduce the flood of patients to hospitals. C19check.com acts as an easy way to digest expert information and choose the best plan of action.



to quickly compare each county's COVID-19 cases, deaths, and social characteristics to the state and national average; visualize the relationship between social determinants (such as percentage of the population that is African American, that is living in poverty, that is more than 65 years old, etc.) and COVID-19 outcomes; and create side-by-side maps comparing key metrics at the county level.

Public health experts have launched a sweeping NIH-funded national probability survey of active infections and seropositivity to understand how many adults in the US without a confirmed history of COVID-19 infection have antibodies to the virus. The presence of antibodies in the blood indicates a prior infection. The findings, which are being published on the study website, COVIDv.org, will help illuminate the extent to which the virus has spread undetected in the country.

An estimated 40 percent of all deaths from COVID-19 in the US have occurred among nursing home residents or employees, and even the strictest measures have not slowed the spread. Mathematical models using specific data are key to developing effective response plans. A public health research team is generating nursing home data needed to understand and reduce disease transmission in these settings.

Emory nursing researchers are leading the way in documenting some of the processes that were set up to make caring for COVID-19 patients more effective and efficient. At the Emory Clinic, a Care Coordination and Transitions Management (CCTM) team comprising registered nurses, social workers, and primary and hospital medical providers established a multidisciplinary model for transitioning COVID-19-positive patients from hospital to com-

munity. The team created a mechanism for discharged patients to connect with a primary care provider (PCP) who followed up with the individuals via telemedicine. The PCP was responsible for then creating an individualized plan of care. The CCTM team will follow up with the patient by telephone on a consistent schedule for up to four weeks postdischarge. In addition, the CCTM team supports the patient's psychosocial needs after they are discharged.

Emory researchers are also looking at the longer-term impact among COVID-19 survivors, including neurological and respiratory effects. One study by a team of Emory rheumatologists has identified similar activation patterns among COVID-19 patients as they had seen in lupus, which has possible implications for those who report "long-haul" symptoms.



Providing care

By leading in health care delivery and research, Emory demonstrates its cornerstone importance to the community every day, but especially so when something as serious as a pandemic strikes.

As cases of COVID-19 multiplied, Emory caregivers across the city and state rose to the challenge, with nearly 4,000 doctors, nurses, and allied health professionals treating COVID-19 patients.

Their competence and dedication is evident in the many expressions of gratitude from patients as well as in the encouraging number of patients successfully discharged. Despite the potentially serious risk to every patient who contracts the virus, Emory was able to send home 6,833 of the 7,423 COVID-19 patients who were hospitalized during 2020.

HELPING ELIZABETH MATTHEWS BEAT THE ODDS

If you are Black in America, according to the CDC, you are 1.4 times more likely to contract COVID-19 than whites, 3.7 times more likely to be hospitalized, and 2.8 times more likely to die. Three generations of the Johnson family faced that challenge recently after a call between Elizabeth Matthews, 83, and her granddaughter, Mikisha Johnson, concerned Mikisha and her mother, Barbara Johnson. Elizabeth had struggled to string words together and sounded disoriented.

Seeking answers, the family quickly brought Elizabeth to Emory Saint Joseph's Hospital, where doctors found that not only had she suffered a stroke;

she also tested positive for COVID-19. "I got real emotional when they told me that," she says. "I was thinking, 'Am I going to die?'"

For months after the COVID-19 outbreak began, it was largely understood as an assault on the respiratory system. What is still less understood, but just as alarming, is the damage the virus may be doing to the brain—from strokes to reports of headaches, seizures, and confusion.

"We are recognizing that COVID-19 actually has a significant neurologic effect," says Byron Milton III, a psychiatrist in physical medicine and rehabilitation at Emory University Hospital who is helping COVID-19 patients cope with dementia-like symptoms and other neurological problems.

Elizabeth's six days at Emory Saint Joseph's Hospital helped her get back on her feet. And despite some lingering breathlessness, Elizabeth is delighted that she will be around when her granddaughter has her first baby.

ESTABLISHING A NATIONAL STANDARD OF CARE FOR COVID-19 TREATMENT

Beyond those cared for at Emory are the many others across the world who benefit from Emory research. By participating in the ACTT-1 (Adaptive COVID-19 Treatment Trial), sponsored by the National Institute of Allergy and

Three generations of this family are grateful that Emory helped Elizabeth Matthews (center) recover from both COVID-19 and the stroke that the virus might have provoked. Flanking Matthews is her daughter, Barbara Johnson (left), and Johnson's daughter, Mikisha Johnson (right).



With about 30 percent of patients preferring telehealth as their mode of care, it will continue to play an important role even after COVID-19.

ABOVE: Back to hanging out with his twin brother Clint (left), Sam Friday had a tough go with MIS-C, the COVID-19-related multisystem inflammatory syndrome affecting children. Emory doctors such as Preeti Jaggi are following cases carefully, learning all that they can.

LEFT: Telemedicine serves patients' needs well during COVID-19 restrictions, so Emory Healthcare quickly ramped up its capacity to deliver.

Infectious Diseases, Emory contributed to a national standard of care for COVID-19 treatment. The ACTT-1 study began in February 2020 and included participants from 45 sites in the US and 15 in Europe and Asia. Emory clinical sites enrolled more participants than any other site in the world.

When results were published in November 2020, they showed that in adults hospitalized with COVID-19, the antiviral drug remdesivir resulted in faster recovery, fewer days on oxygen, and lower progression to a ventilator compared with placebo. Says Nadine Rouphael, Emory's co-lead investigator, "The work of our team contributed not only to the advancement of research and clinical standards but also to helping many of our patients recover and return home to their families."

EXPANSION OF TELEMEDICINE

Before COVID-19, Emory Healthcare conducted several telehealth visits per week in only two or three specialty areas. Since mid-March 2020, Emory has conducted an average of 12,000 visits per week across 38 specialties, changing health care delivery for the foreseeable future and possibly forever.

Through Emory Connected Care, patients can consult with their health care providers from home using a webcam or mobile device with a camera. According to Gregory Esper, associate chief medical officer at Emory Healthcare, who leads Emory's telehealth initiatives: "Ramping up a robust telehealth practice from very few visits a week to around 12,000 has been an amazing transformation." With about 30 percent of patients preferring

telehealth as their mode of care, it will continue to play an important role even after COVID-19.

Through the Emory Healthcare Veterans Program (EHVP), veterans and service members have increased access to telemedicine in 13 states. Since 2015, the EHVP has treated more than 2,300 warriors with a variety of mental health concerns. Treatment efforts include a two-week intensive outpatient program (IOP). During the early weeks of the pandemic, EHVP leaders worked to develop a remote IOP that delivers at-home care.

TREATMENT AND STUDY FOR SERIOUSLY ILL CHILDREN

Although pediatric deaths from COVID-19 are rare, with 94 percent of cases considered mild to moderate,

some children can become seriously ill, particularly those with underlying medical conditions. Multisystem inflammatory syndrome, or MIS-C (the “C” is for “Children”), is a condition where children’s body parts can become inflamed.

Says Preeti Jaggi, associate professor of pediatric infectious diseases and a clinician at Children’s Healthcare of Atlanta, “Kids can become ill from COVID-19 requiring hospitalization, just not at the same rates as adults.” MIS-C was first identified at the end of April 2020, so clinical care and research are still in the beginning stages. Jaggi, for instance, has seen about 40 children with the illness.

As well as caring for children with COVID-19 and COVID-related illnesses, Jaggi and her colleagues have conducted studies as rapidly as they can collect data, hoping to find out more about pediatric transmission, manifestation, and treatments. Jaggi also has been involved in studies to describe similarities and differences in the evaluation and treatment of MIS-C at hospitals in the United States as well as to measure SARS-CoV-2 serologic responses in children hospitalized with MIS-C compared to COVID-19, Kawasaki disease, and other illnesses.

As scary as MIS-C can be, most children recover, but there may be lingering problems. “We are tracking everything in these kids,” Jaggi says, “carefully monitoring their follow-up with specialists, like cardiology, to make sure they don’t have long-term issues.”

TWO WAYS TO CARE FOR OUR OWN

As soon as the virus hit, health care workers and first responders in Atlanta stepped up to treat waves of Georgians

sickened by the virus. We know too well by now the toll that care exacts, with medical staff sometimes falling ill themselves or suffering from exhaustion and stress.

Emory Giving and the James M. Cox Foundation partnered to organize Feed the Front Line, an initiative to provide meals for the heroes battling the pandemic. More than 100,000 meals were delivered to Atlanta Police and Fire Rescue, Atlanta VA Medical Center, Children’s Healthcare of Atlanta, Emory Johns Creek Hospital, Emory Saint Joseph’s Hospital, Emory University Hospital, Emory University Hospital Midtown, Winship Cancer Institute, Grady EMS, Grady Memorial Hospital, Northside Hospital, Piedmont Hospital, and Wellstar Health System.

Says Kristal Bryant, a nurse at Hughes Spalding, “These generous gifts remind us daily that we have not been forgotten during this uncertain time.” Judith Service Montier, the CEO of Chez Montier, one of the food industry partners, responds, “It’s a real honor to know that the work we are doing is making a difference.”

Pair a warm meal with someone to talk to after a hard shift, and that goes a long way.

Emory’s Department of Psychiatry and Behavioral Sciences (PBS), in league with other behavioral health professionals from the School of Medicine, recognized the contributions they could make to colleagues experiencing stress during the pandemic. They put out a call for volunteers and, in response, more than 100 psychologists, psychiatrists, and social workers came forward to donate their time and services.

They offer free same-day support calls, same-week follow-up therapy and medication management

appointments, and department group debriefing sessions to their colleagues at Emory Healthcare, Emory School of Medicine, Atlanta Veterans Affairs, Grady Health System, and Children’s Healthcare of Atlanta. They have even shown up in intensive care units to offer immediate coping help.

Notes the interim chair of PBS, William McDonald, “The COVID-19 pandemic has put significant pressure on our health care system and the frontline workers caring for patients and their families, which is why the Department of Psychiatry and Behavioral Sciences developed a comprehensive plan to support health care providers.”

The new programs are the ASAP Clinic, which provides individual mental health services, and the Caring Communities program, which offers group mental health sessions and a variety of community wellness resources and information.

Professor Nadine Kaslow, who directs Caring Communities, emphasizes “the tremendous emotional stress that frontline health care workers are under and how grateful they are for these easily accessible and helpful services.” She also highlights “how meaningful it is for the Caring Communities and ASAP Clinic team members themselves to provide an array of innovative and responsive behavioral health services.”

Since late March 2020, they have offered hundreds of volunteer hours and more than 600 mental telehealth appointments via Zoom between 6:00 a.m. and midnight daily.

Additionally, Emory Healthcare has launched a “Resilience” campaign urging health care workers to “invest in self-care” and outlining tips for mindfulness, exercise, and nutrition—even play.



“We need to reimagine acute care and create equitable tech-enabled care, especially in the context of COVID-19.”

—MONIQUE SMITH, FOUNDING DIRECTOR OF HEALTH DESIGNED

Serving the underserved

The COVID-19 virus has driven home the consequences of systemic inequities in the nation's health care system. Pacific Islanders, the Latinx community, African Americans, and Indigenous people all have a death rate from COVID-19 double or more that of white or Asian Americans.

Each year our community benefits totals—which include the cost of charity care provided by Emory Healthcare and the investment in teaching and research within the Woodruff Health Sciences Center—reflect the university's deep investment in, and care for, the diverse communities we serve.



ACCESS MOBILE

To support communities of color in the greater Atlanta region, Emory and access.mobile have created an easily scalable mobile-engagement campaign to reach individuals on their phones in a preferred and trusted way, thus creating better health care access during the pandemic's reign.

The Emory group calls itself the Health DesignED: The Acute Care Design and Innovation Center, and it seeks out collaborative innovation

projects that reimagine the acute-care continuum and intentionally serve the needs of diverse patient populations.

Through Emory's Collaborative Community Outreach and Health Disparities Group, the partners are working directly with community-anchor organizations in metro Atlanta to provide critical and timely COVID-19 information about prevention strategies, online symptom checking, mobile testing sites, contact tracing, and community-based or telehealth services.

Building on the impact of Emory's COVID-19 symptom checker, C19check.com (see p. 6), Access Mobile (access.mobile.io) and Emory are creating versions of the symptom checker for those with limited or no access to internet.

The SMS- and USSD-based versions stratify patients based on their symptoms and provide localized recommendations and resources tailored to their profile. The engagement solution offers health data about potential outbreaks and dynamic public health messaging, and it can support contact tracing and vaccine or treatment education.

"We need to create equitable tech-enabled care, especially in the context of COVID-19," says Monique Smith, founding director of Health DesignED. "That is why we are partnering with access.mobile to drive innovation and improve health equity."

COVID-19 HEALTH EQUITY DASHBOARD

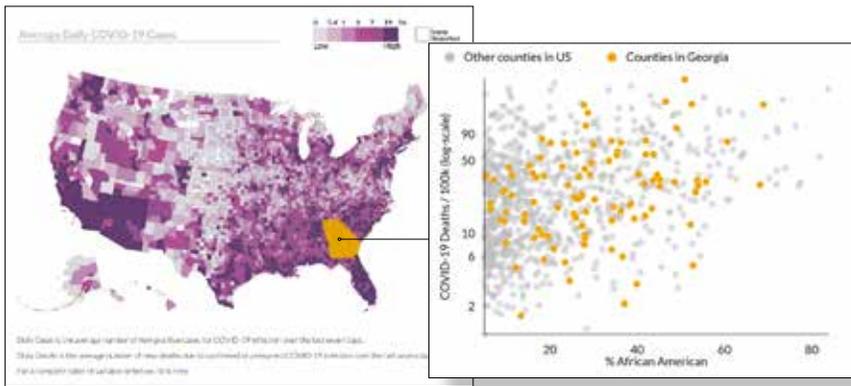
So well respected is the COVID-19 Health Equity Dashboard developed at Emory that it is listed on the CDC



website. Shivani A. Patel (left), assistant professor of global health at Emory's Rollins School of Public Health, leads the team that developed

the dashboard. The tool synthesizes information to guide localized response to the epidemic over time. As Patel notes, "Our goal was to go beyond describing COVID-19 incidence in communities. We wanted to fill in the gaps about the interplay between the health outcomes and the underlying social determinants and other vulnerabilities."

On the dashboard's homepage, users can see a snapshot of COVID-19 deaths across the country. Selecting a state brings up a map displaying COVID-19 mortality by county. Drilling down, users can select a county to see how it compares to the rest of the state and to the country in average daily cases and deaths, and in characteristics such as percentage of African American residents as well as percentage who live in poverty, are obese, or have diabetes.



ABOVE: The COVID-19 Health Equity Dashboard shows the interplay between social determinants and COVID-19 epidemiological metrics at the county level.

Going forward, Patel and her team plan to parse that data into a subcounty level. For example, she is working with the Georgia Department of Public Health to break down COVID-19 cases, hospitalizations, and deaths by race, age, and neighborhood.

Says Patel, “This dashboard could help officials assess whether local response to COVID-19 is equitable across communities. It will provide data to decide where testing sites should be located or how to prioritize populations now that vaccines are available.”

REACHING THE LATINX COMMUNITY

Ingrid Pinzon (below), medical director of care coordination and hospitalist at



Emory Johns Creek Hospital, knows the odds for members of the Latinx community who develop COVID-19, and has been doing all she can

to spread the word about ways they can protect themselves.

Latinx communities make up 18.5 percent of the US population but nearly 31 percent of COVID-19 cases. The numbers in Georgia are similar.

Pinzon and other bilingual Emory Healthcare physicians are going to food

drives and festivals organized by the Latin American Association and other groups—talking to people in Spanish about how to wear masks, social-distance, and recognize the symptoms.

Says Pinzon, “I see myself in my Latinx patients. When I arrived here, I did not know any English. I have the opportunity as a Hispanic doctor to add value to a resilient community, ensuring that my patients’ questions about COVID-19 and other conditions are answered in a way they understand.”

THE ‘CAREGIVING DURING CRISIS’ PROJECT

Nursing faculty members Carolyn Clevenger, Fayron Epps, and Ken Hepburn are developing an online course for family members and friends caring for those with Alzheimer’s disease and other dementias during times of crisis like the COVID-19 pandemic.

The course will train caregivers in three areas: the establishment and maintenance of what the developers call a Safe Home environment (including infection control, safely leaving and reentering one’s home, and how to manage visitors); navigating the health care system on behalf of the person with dementia; and strategies to guide behavior and create activities that add to the pleasure of someone living with dementia.



A PERSONAL MILESTONE BECOMES A COMMUNITY ONE

Kimberly Manning, Emory School of Medicine professor, turned 50 in 2020. Ordinarily, that would be a cause for celebration only to those closest to her. But as she thought about another milestone in her life—the fact that last year marked 20 years of service at Grady Hospital—Manning made a wish online that went like this: “My 50th birthday dream is to raise \$50,000 for the Grady COVID-19 Response Fund by the end of September 2020. Given the disproportionate impact that COVID-19 has had on the Black community, this is personal to me. I hope you’ll let it be personal to you too.”

She cited Grady’s status “as the only hospital system that turns no one away regardless of ability to pay” and promised that dollars received would support patient care, medical supplies, testing resources, and staff support.

Contributors eclipsed the \$50,000 goal easily; the fund now boasts more than \$200,000. Though Manning was honored to help the larger community, in some sense she sees it as repayment. As she notes, “Everyone knows that Grady saves lives. But for the past 20 years, Grady Hospital has saved my life too. I am better for being here, serving here, teaching here, and growing here.”

CUTTING THROUGH THE CHAOS

From the first reports of COVID-19 a year ago, the public has been flooded with misinformation—about the virus, treatments, and vaccines. Emory experts have been called upon to write op-eds, appear on live news broadcasts, and serve as expert advisers. They've turned home offices into temporary studios and used social media to get health facts out. Here are just a few of our public scholars:

SANJAY GUPTA

Perhaps the Emory physician with the most airtime during the pandemic is Associate Professor of Neurosurgery Sanjay Gupta, CNN's chief medical correspondent and host of *Sanjay Gupta MD*, for which he has won multiple Emmy awards. Gupta continues to see patients as a general neurosurgeon at Grady Memorial Hospital in Atlanta.

He is a frequent contributor to numerous CNN shows covering the crisis and hosts a weekly town hall with CNN anchor Anderson Cooper. Each week, on *CNN Health*, the father of three answers kids' questions about COVID-19, and he also hosts the *Coronavirus: Fact or Fiction* podcast (cnn.com/audio/podcasts/corona-virus).

Viewers look to Gupta—a trusted medical journalist—for understandable medical explanations and for guidance regarding the ever-evolving discoveries about COVID-19.

CARLOS DEL RIO

Carlos del Rio—executive associate dean for Emory's School of Medicine and Grady Health System, distinguished professor in the Department of Medicine, and professor of global health and epidemiology in Rollins School of Public Health—is a sought-after expert on COVID-19.

From appearing live on CNN and MSNBC's *Rachel Maddow Show* to coauthoring several viewpoint articles on the novel coronavirus in the *Journal of the American Medical Association*, from serving on the National Collegiate Athletic Association's COVID-19 advisory panel to his more than 33,000 followers on Twitter, del Rio doesn't back away from

challenging misinformation and calling out poor decisions.

He understands the power of social media to reach people directly. Del Rio has done several Facebook Live webinars and tweets nearly every day.

NADINE KASLOW

Nadine Kaslow, professor of psychiatry and behavioral sciences, is often called on by the media to comment on effective coping strategies during times of crisis. She has been called on frequently during the pandemic, by everyone from CNN to Georgia Public Broadcasting.

She has written op-eds for CNN.com, done Q&As on

social media on the topic of mental health and COVID-19, and speaks about how children are being impacted by the virus.

COLLEEN KRAFT

Colleen Kraft is no stranger to pandemics. Five years ago, the associate professor of infectious diseases and pathology played a lead

role in treating Ebola patients who came to Emory during the 2014–2016 outbreak. Now she's helping to coordinate response to COVID-19 as an associate chief medical officer at Emory University Hospital.

Kraft is helping to shape the national conversation—and public health policies—on the coronavirus pandemic. She's made appearances on CNN, NBC, and NPR programs; written op-eds; and was profiled in the *Los Angeles Times* and the *Atlanta Journal-Constitution*. Kraft also was named to the NCAA COVID-19 advisory panel and serves on Georgia Governor Brian Kemp's coronavirus task force.



Helping the state and counties respond

The Georgia Department of Public Health and the Fulton County Board of Health have partnered with Emory's Rollins School of Public Health on their COVID-19 responses. As chair of the board for the Department of Public Health, Rollins Dean James Curran has been consulting with Kathleen Toomey, the department's commissioner, since the earliest days of the pandemic. The school formed a formal partnership with the department—the Emory COVID-19 Response Collaborative—making faculty, staff, and students available to support the state's efforts in key areas of its response. "Never is the mission of public health—to promote, protect, and advance health—more critical than in a pandemic," says Dean Curran. "This is our wheelhouse. This is what we do."

DECIPHERING THE DATA

Rollins epidemiologists have been lending their expertise to the state since the earliest days of the pandemic. The school's scientists have been able to help take the data a step further, drilling down beyond who has the virus to discover how they might have contracted it, what course their disease took, and what modifying factors might have influenced the severity of their response. Modeling experts are helping predict transmission patterns, identifying locations vulnerable to outbreaks, and exploring vaccine-distribution options.

In addition, Jodie Guest, vice chair of the Department of Epidemiology, has held weekly Facebook Live events to present the latest data, answer questions from the community, and dispel misinformation.

RESPONDING TO OUTBREAKS

A group of Rollins students, led by Guest, have formed a rapid-response team to set up testing sites quickly in response to local outbreaks. Their first foray was in April 2020, when health care officials in Hall County contacted Rollins seeking assistance with a small, fledgling outbreak of COVID-19 among the area's mostly Latinx poultry plant workers. Since then, Guest and her students have set up more than 20 rapid-testing sites around the state as well as partnered with the Mexican Consulate, the Black Inmate Commissary Fund, and the city of Atlanta.

BOLSTERING THE EPIDEMIOLOGY WORKFORCE

A seminal feature of the collaboration is the establishment of the Rollins COVID-19 Epidemiology Fellows program, a two-year service and training fellowship that aims to bolster

Georgia's epidemiologic capacity. In its first cohort, the program recruited 17 recent MPH graduates and placed them as entry-level epidemiologists at the Georgia Department of Public Health and across the state's health districts. The fellows are immersed in hands-on applied epidemiology to aid their jurisdiction's COVID-19 response as well as being given additional support and training through the program.

STUDENT VOLUNTEERS

Rollins students, many of whom are members of the school's Student Outbreak and Response Team (SORT), have volunteered their time and efforts at state and local health departments as well as the CDC. Through the years, SORT members have worked with these partners on outbreaks of Ebola, SARS, and Zika.



CLOCKWISE FROM TOP LEFT: Jodie Guest, vice chair of the Department of Epidemiology at the Rollins School of Public Health, hosts a Facebook Live event.

Rollins epidemiology students who are part of a rapid response team worked with the Milledgeville fire department to set up a testing site.

Emory employees prepare to administer the Pfizer vaccine (two photos).

An outbreak response team member enrolls a participant in a COVID-19 antibody study.

Rollins students and staff test poultry workers in Hall County (two photos).

Beyond COVID-19

Although the Woodruff Health Sciences Center (WHSC) devoted considerable resources, time, and talent to responding to COVID-19 in 2020, it also contributed to the community in myriad ways not related to the pandemic.

In FY2019–2020, Emory Health-care provided \$130 million in charity care, which includes indigent care for patients with no health insurance, not even Medicaid or Medicare, and no resources of their own, and catastrophic care for patients who may have coverage but for whom health care bills are so large that paying them would be permanently life shattering.

The WHSC had an \$11.4 billion impact on the metro-Atlanta economy, which reflects job creation, tax revenue, and capital investment.

Here are but a few examples of how the WHSC serves the local and state community:

■ **Emory and the Hazelden Betty Ford Foundation** have signed a letter of intent to create the Addiction Alliance of Georgia, a unique collaboration aimed at reducing addiction rates, improving recovery rates, and saving lives throughout the state. The alliance will partner with diverse stakeholders to provide comprehensive treatment and recovery support to both insured and underserved people. Emory and Hazelden Betty Ford will also work together to advance addiction-related education and research.

■ **Emory's Proton Therapy Center** celebrated its second anniversary and marked an important milestone—treating more than 1,000 patients. Winship Cancer Institute is the first center in

Georgia to treat patients with proton beam therapy, an advanced radiation oncology treatment option.

■ **The Emory Transplant Center** is making it easier for patients in South Georgia to access kidney and liver transplant services. Emory Transplant Center Thomasville opened its doors in early December, joining a network of clinics throughout the state. The center is among the top transplant programs in the nation for overall adult volume and has performed more than 9,700 transplants.

■ **DeKalb County School District and Emory** will collaborate on the development of six school-based health centers in DeKalb County Schools. The centers will serve to improve the overall health and well-being of children and adolescents through comprehensive health services that support the student, their families, and the school system. Plans are under way to launch school-based health centers in Jeff Davis and White counties.

■ **Emory Healthcare worked with Grady Memorial Hospital** for several months to help fill patient-care gaps that were left following Grady's water pipe break. Grady patients were taken to Emory Decatur Hospital and Emory Hillandale Hospital. Emory Decatur Hospital assisted in the mother/baby area with deliveries that would have traditionally occurred at Grady.

■ **Entire families in Clarkston** who otherwise may not have been able to afford vision care are now able to get eye exams and glasses, thanks to Emory Eye Center faculty. Emory ophthalmologists, optometrists, and students visit the Clarkston Community Health Center every weekend to provide vision care services. The center has partnered with the Georgia Lions Lighthouse to provide glasses to those who need them.

■ **Emory's Nell Hodgson Woodruff School of Nursing** is expanding in downtown Decatur. The school is renovating 70,000 square feet in a landmark office building that once housed Wells Fargo Bank. When it's complete, the Emory Nursing Learning Center will include a 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.

■ **People experiencing homelessness in Atlanta** received needed assistance through the Dignity Pack Project, developed and run by three public health students to provide hygiene and menstruation supplies, condoms, and PPE. The project, which began in August 2020, has provided approximately 500 Dignity Packs in a short period of time to a population with increasing needs during COVID-19.



The WHSC had an \$11.4 billion impact on the metro-Atlanta economy, which reflects job creation, tax revenue, and capital investment.



TOP: Public health students are addressing the needs of homeless people for hygiene supplies through the Dignity Pack Project.

ABOVE: The Emory Nursing Learning Center will feature a cutting-edge simulation and skills lab.

BOTTOM LEFT: Emory Eye Center faculty members are providing vision care services to members of the Clarkston community who might otherwise not be able to afford them.

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

Exemplary Service in Extraordinary Times

The COVID-19 pandemic made 2020 a year unlike any other, yet one thing remained steadfast: the people of the Woodruff Health Sciences Center's ongoing commitment to provide superior health care, research, and education to those we serve.

Our frontline medical teams have more than risen to the challenge—facing COVID-19 with remarkable skill and fortitude,

as well as ensuring that all patients receive our highest, most compassionate standard of care. During one of the most challenging times in the history of modern health care, I have had the privilege of seeing every day our team's expertise, ingenuity, and limitless well of compassion—particularly in their response to the COVID-19 pandemic.

Despite the difficulties of continuing their work during the spring 2020 shutdown and often having to do more with less, our research teams brought in record-breaking awards and propelled Emory into the top tier of universities nationwide in terms of COVID-19 research funding. Through their lifesaving work, we have seen the concept of community take on a different and more expansive meaning this year as Emory's COVID-19 research continues to benefit people not only locally but across the state, country, and world.

Our educators rapidly innovated and adapted to new models of learning to provide our students the first-rate instruction they expect from Emory while protecting their safety and that of our community.

I am so grateful to our faculty, staff, and students for their dedication to providing exemplary service in extraordinary times, and I am optimistic that 2021 will be a brighter year for us 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

Yerkes 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, 751 beds, including 82 at Wesley Woods
- Emory University Hospital Midtown, 529 beds
- Emory University Orthopaedics & Spine Hospital, 120 beds
- Emory Rehabilitation Hospital, in partnership with Select Medical, 56 beds
- Emory Saint Joseph's Hospital, 410 beds
- Emory Johns Creek Hospital, 110 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, 2,470 physicians, nurse practitioners, physician assistants, and other providers, with offices throughout the city and state
- Emory Specialty Associates, 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, 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 774 Emory faculty and 368 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, 466 hospital beds, including a 120-bed community living center, 61-bed domiciliary, and 12-bed psychosocial residential rehabilitation program. Staffed by 320 Emory physicians.

COVID-19 CENSUS

(for calendar year 2020)

NUMBER OF ADMITTED COVID-19 PATIENTS—	7,423
NUMBER OF PATIENTS NEEDING ICU CARE—	1,973
NUMBER OF SUCCESSFULLY DISCHARGED PATIENTS—	6,833
NUMBER OF BEDS USED DURING COVID-19 PEAKS—	484
NUMBER OF FRONTLINE WORKERS—	3,896
TRAVELING HEALTH CARE WORKERS THAT HAD TO BE BROUGHT IN—	1,207
VALUE OF UNREIMBURSED CARE FOR COVID-19 PATIENTS UNDER THE HRSA UNINSURED PROGRAM—	\$56 MILLION

QUICK STATS

HOSPITAL CAMPUSES—	11
OUTPATIENT LOCATIONS—	130
INPATIENT BEDS—	2,691
PHYSICIANS—	3,673
EMPLOYEES—	33,456
STUDENTS + TRAINEES—	5,848

VALUE TO THE COMMUNITY

Emory's Woodruff Health Sciences Center benefited the community in a variety of ways in FY2019–2020.

COST OF CHARITY CARE PROVIDED BY EMORY HEALTHCARE	\$130 MILLION*
SHORTFALL BETWEEN EMORY HEALTHCARE'S COST TO PROVIDE CARE TO MEDICAID PATIENTS AND REIMBURSEMENT FROM MEDICAID	\$110 MILLION
FINANCIAL AID PROVIDED TO STUDENTS FROM TUITION INCOME	\$36 MILLION
EMORY HEALTHCARE INVESTMENT IN WHSC TEACHING AND RESEARCH	\$102 MILLION
WHSC INVESTMENT IN RESEARCH UNRECOVERED FROM SPONSORS	\$165 MILLION
UNREIMBURSED CARE PROVIDED AT GRADY HOSPITAL	\$29 MILLION
INVESTMENT OF EMORY MEDICAL CARE FOUNDATION SERVICES AT GRADY HOSPITAL	\$54 MILLION
OTHER COMMUNITY BENEFITS	\$51 MILLION†
TOTAL	\$677 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—\$39.9 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—\$11.4 million

Based on expenditures of \$5.8 billion in FY2019–2020, the WHSC has an estimated economic impact on the metro area of \$11.4 billion.



EMORY

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Emory ranks number three nationwide in NIH awards for COVID-19 among universities.

