



Newly discovered immune cell can unlock the key to repair damaged nerve cells. | Pages **28-30**

Transforming Health

Annual Report
2021



**THE OHIO STATE
UNIVERSITY**
COLLEGE OF MEDICINE

INCLUSIVE AND INNOVATIVE EDUCATION, DISCOVERY AND CARE



Each year, over 200 medical students graduate from Ohio State and go on to be collaborative and compassionate leaders in medicine.



ABOUT THE COVER:

Researchers at The Ohio State University College of Medicine are exploring the potential of a “holy grail” immune cell’s ability to repair or regrow damaged nerves in humans. Our cover illustration depicts these cells (neutrophils, in purple) sending growth factors (in orange) to help restore damaged neurons. Neurologists hope this discovery could lead to new, life-changing treatments for people with degenerative diseases or brain or spinal cord trauma.

Illustration by Anthony S. Baker, CMI, OSU Health Sciences Library Medical Visuals.

Contents of this publication contain photos taken prior to the COVID-19 outbreak.

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Welcome from the Dean



There is tremendous growth and innovation at The Ohio State University College of Medicine, and we are on a trajectory few other institutions can match. We are launching a bold new curriculum for interprofessional education, making ground-breaking novel discoveries, engaging in patient care that advances the practice of medicine and delivering on our belief that a diverse team of faculty, staff and learners leads to better outcomes. Ohio State is the place to be.

EDUCATION

This year we launched our first interprofessional education cohort that connects students from our seven health science colleges and prepares them to face challenges as a collaborative health care team. I am also proud to share that *U.S. News & World Report* ranked us as the seventh Most Diverse Medical School in the country, which is the highest rank achieved by top research schools. Ohio State ranked 33rd for Best Medical School – Research and 28th for Best Medical School – Primary Care.

RESEARCH

Last fiscal year, we had a record \$195 million in National Institutes of Health (NIH) funding and more than \$301 million in total funding that supports biomedical innovations and breakthrough discoveries. Krystof Bankiewicz, MD, PhD, professor of Neurological Surgery, and his team have discovered gene delivery techniques to treat children with AADC deficiency, significantly improving their motor function. Andrew Sas, MD, PhD, assistant professor of Neurology, and Benjamin Segal, MD, professor and chair of Neurology, and their teams have discovered a new type of immune cell that promotes nervous system repair. Both of these discoveries could lead to huge advancements in treating neurological diseases like multiple sclerosis and Parkinson’s disease.

CLINICAL CARE

We are leaders in clinical care. We have seen a 95% growth rate over the last five years in the number of lives saved through organ transplantation and have recently performed our 11,000th transplant surgery. Early in the pandemic, Ohio State embraced the use of monoclonal antibody infusions to treat COVID-19, and since the FDA’s Emergency Use Authorization, we have treated more than 1,750 patients. *Newsweek* ranked The Ohio State University Dodd Rehabilitation Hospital No. 1 in Ohio and one of the top in the nation.

CAPITAL IMPROVEMENTS


With seven health science colleges and a school of health and rehabilitation sciences, The Ohio State University Wexner Medical Center is one of the most comprehensive health sciences campuses in the nation, and we continue to grow. Ohio State has more than \$3 billion planned for capital investments over the next several years, including a new College of Medicine, an 820-plus bed inpatient tower, four new outpatient care centers and an interdisciplinary research building. All these buildings are designed with the patient, learner, clinician and researcher in mind with the goal of innovating biomedical science and improving patient care.

PEOPLE MAKE THE DIFFERENCE

While new facilities are important, the strength of the Ohio State College of Medicine remains its people. Every day, our more than 4,500 learners, nearly 2,600 faculty and thousands of staff members fulfill each facet of our mission to transform the health of our communities — starting with the nearly 2 million people in central Ohio and reaching out to the entire state, the Midwest, the nation and the world.

Together, we will reach our ambition of being a leading college of medicine that transforms the health of our communities through inclusive and innovative education, discovery and care.

Carol R. Bradford, MD, MS, FACS
Dean, The Ohio State University College of Medicine
Vice President for Health Sciences
Leslie H. and Abigail S. Wexner Dean’s Chair

 @DeanBradfordMD

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Transforming the health of our communities through strategic goal setting


At The Ohio State University College of Medicine, we know that health care transformation is possible through deliberate, strategic goal setting that resonates with our faculty, staff and learners.

So we recently unveiled our new strategic plan with this powerful ambition statement:

To be a leading college of medicine that **TRANSFORMS** the **HEALTH** of our **COMMUNITIES** through inclusive and **INNOVATIVE EDUCATION, DISCOVERY** and **CARE**.

To realize this exciting ambition, our faculty, staff and learners are aligned with — and work together toward — our plan’s seven, well-defined goals. Not only does our strategic plan create a strong, distinctive college identity, it sets priorities and facilitates ownership so our teams can embrace a commitment to shared success.

— Carol R. Bradford, MD, MS, FACS
Dean, The Ohio State University College of Medicine
Vice president for Health Sciences, The Ohio State University
Wexner Medical Center



Be a national leader of inclusive excellence by delivering on **diversity, equity, inclusion** and **belonging** among all faculty, staff and learners



Attract, develop, value and retain a diverse and inclusive team of **talented people** committed to innovation, collaboration and impact



Advance **health equity** and address **social determinants** of health




Implement **innovative, interprofessional education** in an inclusive environment to educate and support the most diverse and sought-after health science professionals in the world



Deliver innovative and transformative models of **comprehensive care**



Be a responsible **steward of all resources** to enable strategic investment in all aspects of our mission



Lead **life-altering biomedical discoveries** and their translation into **breakthrough health care solutions**



Ann Scheck McAlearney, ScD,
Distinguished Professor in the
Department of Family and
Community Medicine



Eugene Oltz, PhD, Chair, Department of
Microbial Infection and Immunity

Each day, faculty, researchers and learners at The Ohio State University College of Medicine bring together expertise and drive to advance innovations and solve unrelenting medical and health care challenges. Discovery and transformation are methodical and measured; solutions don't often appear overnight.

Unless the world is in the grips of an unprecedented global pandemic.

Never before in history has the leadership, passion and determination of so many innovators been mobilized as rapidly and efficiently, and in some cases in a matter of days, as during the pandemic.

It took the work of many to create solutions to save lives and model to others how to face COVID-19 head-on.

Ohio State has led COVID-19 prevention and treatment efforts from mass vaccination sites and post-COVID-19 recovery care, to record delivery of monoclonal antibody infusions that kept patients out of hospitals, and research on the long-term impact of COVID-19 on first responders and health care workers.

**TEAMING UP TO SHARE
EXPERTISE AND INFRASTRUCTURE**

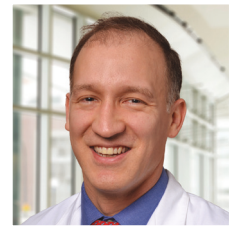
The Ohio State College of Medicine is a long-standing site for clinical trials that test the safety and efficacy of new treatments for HIV/AIDS, cancer and many other medical diseases. Expertise in collecting and analyzing complex datasets and existing infrastructure enabled the academic institution to quickly respond to the reality of COVID-19 on the ground. Teams of researchers and clinicians came together to provide evidence-based treatment for high-risk patients with mild to moderate cases of COVID-19.

In addition to the more than 100 COVID-19-related studies underway across the university, COVID-19 vaccine clinical trials and early trials on the safety and efficacy of monoclonal antibody infusions have been taking place on campus since the first days of the pandemic.

Monoclonal antibody infusions are laboratory-made proteins that mimic the immune system's ability to

Ohio State drives remarkable **COVID-19** innovations to save lives

fight off harmful antigens such as viruses. They can attach to the spike protein on the surface of the virus and block it from invading human cells. Among multiple treatments that have been evaluated at the Ohio State College of Medicine, researchers studied an antibody therapy by Eli Lilly called bamlanivimab, which was specifically directed against the spike protein of SARS-CoV-2. It was proven in trials to shorten the duration of the illness and significantly reduce serious complications that could lead to hospitalization.



Carlos Malvestutto,
MD, MPH

Carlos Malvestutto, MD, MPH, assistant professor in the Division of Infectious Diseases, and Jonathan Parsons, MD, professor in the Division of Pulmonary, Allergy, Critical Care and Sleep Medicine at The Ohio State University College of Medicine, co-chair Ohio State's

COVID-19 Outpatient Monoclonal Antibody Program. They mobilized a team of experts in pulmonology, pharmacology, epidemiology, nursing and information technology to convert an existing space into a freestanding infusion center that separated the intake of patients with active cases from non-COVID-19 patients. This facilitated safe administration of anti-spike protein monoclonal antibodies to those who met the criteria.

"The U.S. Food and Drug Administration issued an Emergency Use Authorization for their use in vulnerable patient populations on Nov. 9, 2020," says Dr. Malvestutto. "Seven days later we gave our first infusion in an auditorium that we turned into an infusion site." The Outpatient Monoclonal Antibody Program team continuously reviews clinical trial data, internal utilization and clinical outcomes to optimize the impact of monoclonal antibodies in high-risk individuals treated at Ohio State.

To ensure the effectiveness of the treatment, an eligible patient must receive a positive test result, obtain a referral from a primary care physician to schedule an appointment and then come in to receive an infusion at the designated site as soon as possible, ideally within seven days of the onset of symptoms.

To maximize success within this time constraint, Ohio State leveraged its electronic health records to identify and fast track its high-risk patients and treat them in record time.

"By anticipating the needs of these high-risk patients, we facilitated same-day referrals and have been scheduling infusion appointments within 24 hours of referrals," says Dr. Malvestutto. "Workflows are also in place to administer infusions for COVID-19 patients who arrive in our emergency departments within the allowed time period and meet the high-risk criteria."



Ohio State continues to lead the way in effective prevention and treatment for Ohioans impacted by the pandemic. As of Oct. 1, 1,750 patient infusions have been administered at Ohio State, and internal data shows that the efforts reduced the risk of COVID-19-related emergency department visits and hospitalizations in high-risk individuals by more than 50%.

In response to the current surge in COVID-19 cases driven by the high transmissibility of the delta variant, operations have been ramped up once again to provide infusion treatment to all eligible patients seven days a week.

The Emergency Use Authorization for the antibody cocktail casirivimab/imdevimab has recently been expanded to provide monoclonal antibodies as post-exposure prophylaxis. This indication is based on data also collected in clinical trials at Ohio State and is particularly important for immunosuppressed patients who may not be able to mount an adequate immune response to COVID-19 vaccines.

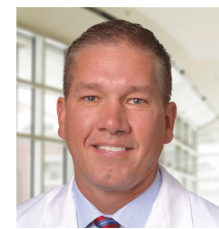
“This is a game changer for all patients with underlying conditions and compromised immune systems who are exposed to COVID-19,” says Dr. Malvestutto. “Instead of quarantining, waiting and hoping they don’t develop severe disease, these patients can receive proactive treatment that will greatly reduce their risk of acquiring COVID-19.”

AN UNPRECEDENTED PUSH TO GET SHOTS IN ARMS TO BEAT THE PANDEMIC

Foresight, science and determination led a group of scientists to develop, test and gain authorization for emergency use of vaccines to combat COVID-19 in record time. Fast action and dedication on the part of experts at the Ohio State College of Medicine and The Ohio State University Wexner Medical Center made it possible to deliver vaccine doses that held so much hope into patients’ arms as soon as possible.

Ohio State became one of the first hospitals in the nation and the first in Ohio to administer the first round of COVID-19 vaccine doses to frontline workers, in December 2020. Unlike other health care systems that prioritized physicians, Ohio State determined who would receive these coveted first doses based on location and exposure risks to COVID-19 rather than their job description.

As vaccine supply ramped up across the state, Ohio State quickly mobilized vaccination clinics at three locations across its Columbus campus. Then, as eligibility for the vaccine expanded, Ohio State transformed the 770,000-square-foot Jerome Schottenstein Center — home to a number of Ohio State athletics teams — into a mass vaccination site in a matter of 10 days. Over four months, operating six days a week and 12 hours a day, more than 200,000 patients maintained social distancing protocols while moving efficiently through the arena to receive their vaccinations.



Jonathan Parsons, MD

Dr. Parsons served as the physician in charge of on-site operations. He saw firsthand the teamwork and dedication it took to pull off 223,000 patient visits so successfully.

“From security to registration to clinical and nonclinical staffing, infection prevention and communications, everyone came together to safely administer vaccines on a massive scale,” says Dr. Parsons. “It was very rewarding to play a part in helping our partners, our community and our families take an important step toward returning to normalcy.”



Sequencing allows us to continuously evaluate the viral genome. By sharing our findings and comparing notes on viral strains with scientists around the world, we track its evolution in real time.

— Daniel Jones, MD, PhD

The study of pathogens and how our immune systems protect against them has shown that vaccines are among the most powerful tools we have against viruses. Data shows that the vaccines against COVID-19, even against the highly contagious delta variant, have proven to be safe and effective for millions of people. Ohio State is equipped to deliver COVID-19 booster shots as more people become eligible.

DISCOVERY OF COVID-19 “COLUMBUS STRAIN” LEADS TO DEEPER UNDERSTANDING OF EVOLVING VIRUS

Every time SARS-CoV-2 — the virus that causes COVID-19 — infects a person, minute changes occur in the virus’s genetic code. All coronaviruses rely on the genetic component called RNA, which are prone to mutations as the virus replicates in the body and moves on to infect another person. Most of these mutations don’t change the behavior of the virus or

alter it in negative ways. But sometimes they bring about change that emboldens or gives the virus a new advantage, like making it more apt to stick to or penetrate immune cells.

Daniel Jones, MD, PhD, professor of Pathology at the Ohio State College of Medicine, and his research team have been at the forefront of COVID-19 research from day one. In March 2020, his team started sequencing the genetic material of samples from infected patients to begin tracking the virus. When they noticed an uptick in similar mutations across samples, it led them to identify the evolution of a specific strain in the United States, now called the “Columbus strain,” which contains three mutations that hadn’t previously been seen together in SARS-CoV-2.

“Sequencing allows us to continuously evaluate the viral genome,” says Dr. Jones. “By sharing our findings and comparing notes on viral strains with scientists around the world, we track its evolution in real time.”

By making these discoveries early, Ohio State scientists have a clearer line of sight to be able to make decisions based on scientific data versus speculation.

Peter Mohler, PhD, vice dean for Research at the Ohio State College of Medicine and chief scientific officer for The Ohio State University Wexner Medical Center, says that Ohio State researchers have uncovered evidence that current vaccines will continue to be effective against these identified new strains, but variations in the future could begin to reduce the effectiveness of current therapies.

“As the number of people with immunity grows through natural infections and vaccinations, it will put pressure on the virus to evolve,” says Dr. Mohler. “Continuing to track it will lead to more scientific breakthroughs in prevention and treatments that will save lives.”

POST-COVID-19 RECOVERY CLINICS ASSIST WITH LINGERING SYMPTOMS

For some patients at the Ohio State Wexner Medical Center, beating an initial acute infection from the virus is not the end of their COVID-19 road. As they recover and get ready to leave the hospital, many take with them fatigue, shortness of breath, headaches, chest pains, palpitations and dizziness.

Researchers at the Ohio State College of Medicine have tracked how COVID-19 can ravage the body in a variety of ways, resulting in damage to the lungs, heart, nervous system, kidneys, liver and mental health. That led them to establish a transition of care clinic to connect patients with advanced practice providers, pharmacists and behavioral health providers as they continue to navigate a new normal brought on by lingering symptoms.

Brooke Bellamy, BSBA, senior director of Access and Capacity Management at the Ohio State Wexner Medical Center, says 250 patients have been seen since Oct. 1 with what's being coined long COVID, or post-acute sequelae of SARS-CoV-2, and the department had arranged 1,178 transition of care appointments.

“Our main goal is to support patients long-term and lessen readmissions to the hospital,” says Bellamy. “It is one thing to recover from COVID, but a whole other set of support is required for care coordination and patient advocacy to manage ongoing symptoms.

“Often it takes patients a bit of time to navigate grief, pain and traumatic stress from battling COVID,” says Bellamy. “As the pandemic continues, behavioral health support is difficult to engage with, so our being able to fast-track support is a huge help.”

LARGE RESEARCH GRANT FUNDS ONGOING STUDY OF VIRUS' LONG-TERM IMPACT ON FRONTLINE RESPONDERS

From day one, first responders and health care workers have been on the front lines in the fight against

COVID-19, putting them at high risk for exposure and re-exposure. They're now at the forefront of research being conducted by the Ohio State College of Medicine on the long-term, longitudinal impact of COVID-19.

A five-year, \$10 million grant from the National Cancer Institute (NCI) in the National Institutes of Health is funding the Center for Serological Testing to Improve Outcomes from Pandemic COVID-19 (STOP-COVID). The center is integrated with the broader NCI Serological Sciences Network, which uses serological and molecular tests to better understand the immune response to COVID-19. Serological testing enables researchers to examine a blood sample for antibodies to determine if an individual has had a past infection with a virus or COVID-19 vaccination.

By studying this specific population and their immediate household contacts over a five-year period, researchers aim to provide answers to looming questions regarding antibodies, vaccine effectiveness, breakthrough and recurrent infections and whether or not past infection with a similar virus, like the common cold, provides any level of immunity against COVID-19 or worsens symptoms.

“COVID-19 is a moving target,” says Eugene Oltz, PhD, professor and chair of the Department of Microbial Infection and Immunity at the Ohio State College of Medicine. “Understanding why some people are more at risk for infection and re-infection, or are symptomatic or asymptomatic, will enable us to adapt treatment protocols as we continue to face new variants.”

Dr. Oltz serves as co-principal investigator along with Ashish Panchal, MD, PhD, professor of Emergency Medicine; Ann Scheck McAlearney, ScD, Distinguished Professor in the Department of Family and Community Medicine; and Linda Saif, PhD, MS, Distinguished University Professor in Ohio State's Department of Veterinary Preventive Medicine in the College of Veterinary Medicine.

The team has built a robust system of recruitment, with the aim of gathering 2,000 participants. When participants join the study, they first fill out a survey, then they receive a COVID-19 test and a blood draw to measure levels of antibodies specific for the virus.

“For those coming in contact with sick patients and community members on a daily basis, receiving results of their viral and antibody status within a day is a huge relief,” says Dr. Panchal. “It also helps us keep close tabs on disease prevalence, which is the first phase of the project.”

Phase two of the study involves serological testing and analysis to determine the cellular makeup, viral load and antibodies in these samples. From there, researchers are able to determine how well existing antibodies can protect against or neutralize emerging variants. Further, by studying patient responses to infection versus the vaccine, they can determine how durable the responses are in comparison.

The final phase of the study is to translate the scientific findings and evidence into practice by developing tools and communication best practices to combat misinformation and distrust in the safety and efficacy of vaccines. It will also enable greater understanding of how science dictates policy and informs new recommendations.

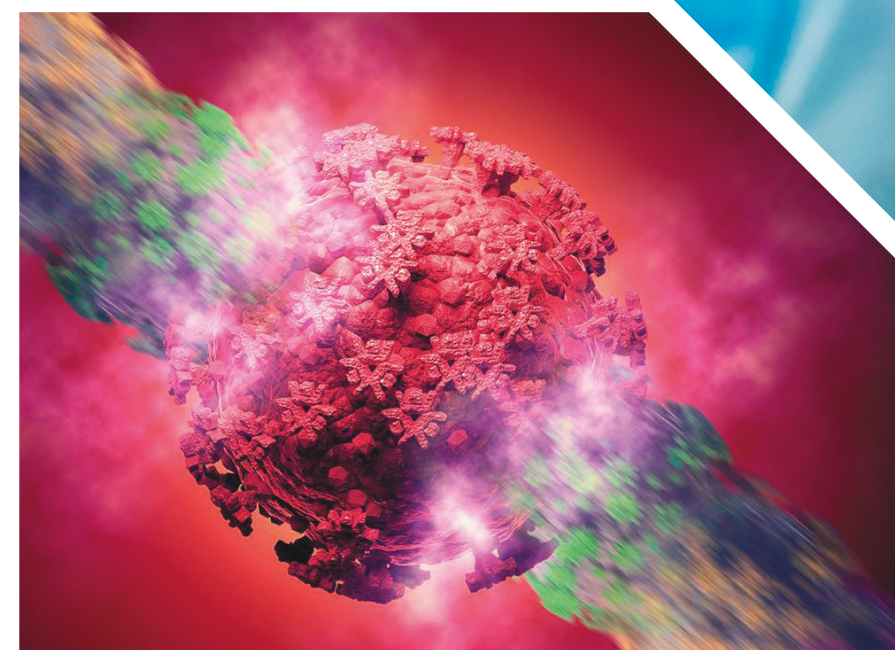
The three phases are concurrent, allowing the team to pivot and solve questions as the virus continues to evolve.

“We have been able to answer new questions by pivoting at the recruitment and data analysis stages,” says Dr. McAlearney. “We can recruit patients with certain histories, work to make sense of these histories and determine how they may impact protection.”

The team has compiled data from surveys and interviews on vaccine hesitancy in certain populations, such as firefighters, EMTs and paramedics. They've surveyed high-risk individuals, including those undergoing treatment for cancer, to assess the likelihood of their receiving the newly available booster shot.

Ohio State has some of the best minds in virology, immunology, serology, technology, internal medicine, emergency medicine and health services research working, mostly virtually, to manage this huge undertaking. Dr. Saif says the pandemic may prevent them from working and meeting together in person, but it has not deterred discovery and innovation.

“We have the infrastructure and bandwidth to accomplish the goal of stopping the spread of COVID-19.”





Reinventing Interprofessional Education in the health sciences

Medical schools around the country hold dear their responsibility of developing the next generation of medical professionals. What makes The Ohio State University College of Medicine unique is its close proximity to six other top-ranked health science colleges and a nationally renowned School of Health and Rehabilitation Sciences, delivering a robust interprofessional education that few others can match.

“Our medical students learn alongside health care professional students as early as their first year,” says Daniel Clinchot, MD, vice dean for Education at the Ohio State College of Medicine. “Interprofessional education is woven into our curriculum at our college because we believe these learning experiences better prepare our students to face challenges as part of a health care team during their residency, and because of that, provide better patient care.”

LEADING A NEW CHAPTER

In July 2020, Andrea Pfeifle, EdD, PT, FNAP, became The Ohio State University’s first associate vice chancellor for Interprofessional Practice and Education (IPE), serving all seven of Ohio State’s health science colleges to establish and advance a culture of interprofessional collaboration among the health disciplines.

We’re producing more compassionate medical care providers who are better able to communicate and are thoroughly prepared to serve the diverse, changing needs of 21st century patients and communities.

— Andrea Pfeifle, EdD, PT, FNAP

“Medical school graduates from Ohio State get a deep understanding of the role of pharmacists, therapists, nurses, public health experts, dentists, optometrists and even veterinary professionals,” she says. “They better know how to work with and coordinate a team of health care professionals because it’s part of their education.”

“Ohio State’s growing health sciences IPE program is part of the College of Medicine’s commitment to optimizing each student’s education,” says Dr. Clinchot.

“We’re producing more compassionate medical care providers who are better able to communicate and are thoroughly prepared to serve the diverse, changing needs of 21st century patients and communities.”

Another unique element is that the program bridges health care education to health care delivery, branching out across the university and into the community — with a focus on reducing health care disparities.

BETTER TOGETHER

“When our student learner groups enter the community, they’re important resources to providing care, and they’re gaining valuable experience,” Dr. Pfeifle says. “They’re learning while meeting community needs that would otherwise go unmet.”

Continued on page 16



Andrea Pfeifle, EdD, became the first associate vice chancellor for Interprofessional Practice and Education (IPE) for seven health science colleges and the Wexner Medical Center in July 2020.



Continued from page 15

Interprofessional Community Scholars, a 12-week immersive community-based program, matches health science students in teams of three or four, overseen by a resident in Ohio State's Department of Family and Community Medicine.

Each team works with a resident from the Near East Side, an inner-city Columbus neighborhood plagued with devastating decline and wage, household income and health disparities. Residents are referred to as "community health mentors" and each play a role in teaching students to become better care providers.

The teams help improve the community health mentor's digital literacy skills, providing them with an iPad, broadband internet and telehealth services as well as connections to other local services they may need to achieve their individual health goals. That includes teaching them how to use Ohio State's online patient portal MyChart to communicate with their health care providers, finding them a primary care provider if they don't have one and enrolling them in Medicaid if needed.

"Though still young, the initiative has sparked enthusiasm throughout the university and surrounding community. Interested Near East Side residents, for example, have more than filled the roster of patients Interprofessional Community Scholars can partner with at the moment," Dr. Pfeifle says.

She and program participants are excited to embark on these new, long-term partnerships that give students more multidisciplinary skills with a diverse patient population.

"Health science students learn from the community they're serving while they're working, and what we have in the end is more than just curriculum — it's a collaboration with the community," she says.



A NEW PATH FORWARD

Launched this year is the new "BuckIPE" program that combines interprofessional education experiences with extracurricular chances to serve and learn in the community.

Through BuckIPE, Ohio State health science students are assigned to teams of eight and stay with that team throughout their education. The teams each include at least one College of Medicine student in addition to students representing the colleges of Dentistry, Nursing, Optometry, Pharmacy, Public Health, Veterinary Medicine and Arts and Sciences (in speech and language pathology).

"Together, these students will move through a series of planned, developmentally appropriate modules throughout their curriculum, along with extracurricular opportunities," Dr. Pfeifle says. "In January, we added community service to their program, giving them a chance to practice applied learning within an authentic population setting."

Other new initiatives include an interprofessional program to help patients with heart failure avoid unnecessary hospital admissions through thoughtful preventive measures, more frequent interactions with providers, early intervention, better patient education and at-home monitoring. Ohio's Care Innovation and Community Improvement Program funds the initiative.

"Right now, the health care industry as a whole has a tendency to work in the silos of their disciplines," she says. "When we better distribute the workforce, we can improve services, access to those services and the volume of care available."

"Health equity is dependent on this care model being implemented broadly — not just in areas of underserved populations, but for everyone — where professionals are working as a team and at the top of their license."

Improving student care of sexual assault survivors through team-based learning intervention

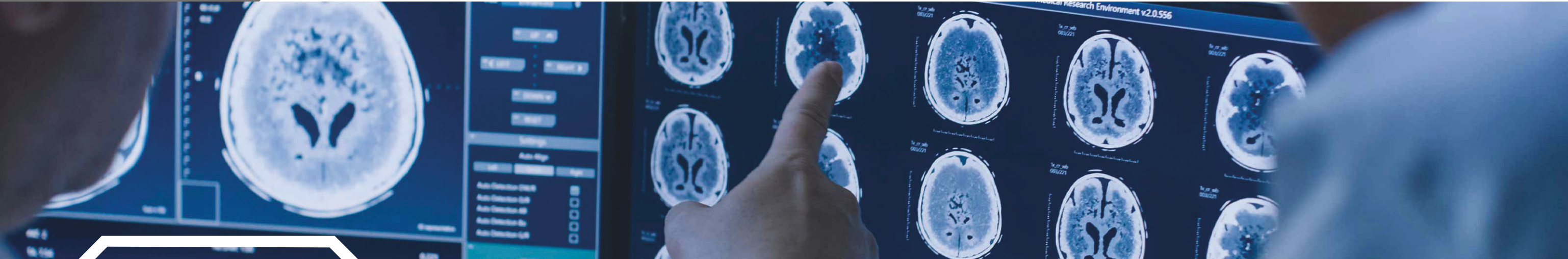
About one in five women in the United States will be the victim of sexual assault in their lifetime, and the number is even higher in marginalized communities. For a patient, the road to psychological recovery from sexual assault can begin by disclosing the assault during a clinician-patient interaction.

To improve sexual assault education in the medical curricula, Ashley Fernandes, MD, PhD, associate professor of Pediatrics and associate director of the Center for Bioethics at The Ohio State University College of Medicine, and Amanda Start, PhD, director of the Office of Curriculum and Scholarship at the Ohio State College of Medicine, teamed up with medical students Kylen Daily, Tiffany Loftus and Colleen Waickman. Together, they developed a student-led, team-based learning activity on how to provide effective care and support to sexual assault survivors.

"We integrated 45 minutes of sexual assault education content into a two-hour, pre-existing mandatory training on family violence for all fourth-year medical students," says Loftus. "The sexual assault component included five core elements: the development of sexual assault learning outcomes, pre-work, knowledge assessment, an application exercise and a discussion centered around how the holistic care of survivors impacts their specialty of choice and their own self-care."

The training includes learning outcomes designed to strengthen medical students' abilities to effectively respond to sexual assault disclosures. This means providing holistic sexual assault care through humanistic communication and comprehensive patient advocacy. In designing the pre-work portion of the module, the team worked with a variety of sexual assault content experts to develop a brochure featuring information about sexual assault and society, empathetic interviewing, emergency department protocol, forensic nursing exam basics, surveyor resources, sexual assault in marginalized communities and the psychological consequences of sexual assault.

Students then complete an assessment that's integrated into an existing team-based learning exercise on family violence. The assessment identifies common myths and stereotypes of sexual assault, and demonstrates effective emotional interviewing strategies. Students then demonstrate takeaways in the application portion through role-play scenarios and conclude the learning module with a 10-minute open discussion on future implications. To account for possible gender bias, the curriculum uses real-life cases of female physicians who made missteps in sexual assault care and questions that include male sexual assault survivors.



Ohio State receives one of the first skull-base fellowship accreditations from CAST

With more than 200 highly complex endoscopic endonasal approach (EEA) surgeries performed by faculty from The Ohio State University College of Medicine each year, the Ohio State Wexner Medical Center is one of the largest volume EEA sites in the world. In addition, several hundred open and traditional craniotomy-type surgeries for skull-base disease are performed here as well.

Daniel Prevedello, MD, professor of Neurological Surgery at the Ohio State College of Medicine and

director of the Skull-Base and Pituitary Surgery Center at The Ohio State University Comprehensive Cancer Center – Arthur G. James Cancer Hospital and Richard J. Solove Research Institute, and Douglas Hardesty, MD, assistant professor of Neurological Surgery at the Ohio State College of Medicine and director of the Ohio State Neurosurgery Gamma Knife Radiosurgery Program, specialize in these skull-base surgeries, a subcategory of neurosurgery dedicated to benign and malignant disease processes located on the anatomical floor of the cranial cavity known as the skull base.

In addition to practicing world-class care, Drs. Hardesty and Prevedello go a step further by providing valuable insights and mentorship to their academic community as leaders of the Ohio State College of Medicine’s skull-base surgery fellowship. This fellowship offers advanced, comprehensive training in skull-base surgery and allows fellows to participate with senior staff in all decisions surrounding surgical preparation, delivery and postoperative care. The opportunity nurtures students in an interdisciplinary setting to become masterful neurosurgeons who approach skull-base diseases through an interdisciplinary lens.

Ohio State’s skull-base surgery fellowship has gained recognition from the academic community. It’s one

of the first skull-base fellowships in the nation to be accredited by the Committee on Advanced Subspecialty Training (CAST) of the Society of Neurological Surgeons.

“This accreditation underscores and recognizes the critical importance and impact of The Ohio State University skull-base surgery program nationally,” says Russell Lonser, MD, professor and chair of the Department of Neurological Surgery at the Ohio State College of Medicine. “It’s a tribute to Drs. Prevedello and Hardesty and their interdisciplinary colleagues’ outstanding patient care and training expertise.”

Student-developed teaching module addresses historical and ongoing racist practices in medicine

The lack of awareness and denial of racism within the profession of medicine relate in part to physicians not recognizing their negatively biased attitudes, perspectives and habits. Second-year medical students Hafza Inshaar, Abbie Zewdu and Deborah Fadoju stepped up to create an educational program for first-year medical students that explores the historical basis for some of the racist practices in medicine. With

assistance from Philicia Duncan, MD, assistant professor of Internal Medicine, and Valencia Walker, MD, MPH, associate professor of Pediatrics, in The Ohio State University College of Medicine, they have uncovered a connection to current racial disparities observed in health outcomes.

The teaching module includes a pre-lecture survey to evaluate medical students’ knowledge and attitudes about racism and racist beliefs within the medical community. This is followed by a recorded lecture that discusses the origins of various medical myths about African Americans that have been passed on as medical truths, and their implications on equitable health care delivery.

Participating students are then asked to engage in thought exercises that utilize patient scenarios to illuminate the real-world, present-day consequences of racist teachings. These activities aim to identify the relationship between teachings and current practices, promote self-reflection to identify subconscious bias and stimulate group discussions on how health care workers can modify their viewpoints and forge change in the way that patients are currently

treated. The aim is to ensure patients receive equitable and quality care regardless of racial/ethnic background. A post-lecture survey is used to gauge the impact of this lesson.

Knowledge of these racist and prejudiced medical myths can prompt students to recognize the ongoing harm they pose to the health of patients, and may encourage students to catalyze their awareness into action.

We hope that future coursework highlights the underlying societal drivers that cause medical disparities.

— Team statement

“This single lecture can’t solve the overarching issue of racism in medicine, and certainly won’t correct all of the gaps in the current U.S. medical education system, but it is a start,” the team said in a statement. “We hope that future coursework highlights the underlying societal drivers that cause medical disparities.”

Training at a leading pediatric hospital offers access to diverse educational experiences



Through innovative curricula, world-class research and dynamic community partnerships, The Ohio State University College of Medicine provides learners with immersive education and training opportunities across

many fields of practice and world-class institutions. The college's Department of Pediatrics is housed at Nationwide Children's Hospital and its Abigail Wexner Research Institute, located just minutes from Ohio State's campus. Hailed as one of the most advanced pediatric hospitals in the world, Nationwide Children's Hospital is currently ranked the No. 8 best children's hospital in the nation by *U.S. News & World Report*.

John Barnard, MD, professor and chair of the Department of Pediatrics in the Ohio State College of Medicine and director of Pediatrics at Nationwide Children's Hospital, oversees 500 physicians who hold faculty appointments in the college. He also directs the education of more than 300 medical students and pediatric residents and fellows training at the institution each year.

"At the bedside, in the clinic, in the community and in the research laboratory, we equip learners with state-of-the-art skills and sophisticated training at all levels of education," says Dr. Barnard.

Each year, more than 200 third-year medical students are supervised on clinical rotations and more than 30 fourth-year students rotate through a number of pediatric specialties with access to a "boot camp" designed for students who'll become pediatric residents. First- and second-year students have the option to shadow physicians, and there are numerous laboratory and research opportunities available in the 500,000 square feet of dedicated child health research space on the hospital campus.



Students participate in formal lectures, attend grand rounds and learn at the bedside in both inpatient and outpatient settings where they see some of the most complex pediatric cases in Ohio. Families travel from around the globe to access lifesaving treatments and care from specialists in hematology, oncology, blood and bone marrow transplant, neurology and gastroenterology. In 2020, there were more than 1.5 million patient visits to this pediatric hospital that is also America's largest neonatal network and provider of inpatient pediatric surgeries.

College of Medicine faculty are engaged and enthusiastic teachers and mentors for students who are learning at one of the top pediatric training institutions in the country.

"Mentorship is central to the development of doctors at all stages of their career," says Dr. Barnard. "The reciprocal nature of the interaction is beneficial to both mentors and mentees."

The quality of education and the college's dedication to improvement and discovery have not gone unnoticed. Annually, graduating medical students from every institution participate in a survey from the Association of American Medical Colleges. Each year, the Department of Pediatrics is the first- or second-ranked clinical department in the College of Medicine, almost without exception.

"NCH and the College of Medicine have been conjoined partners for over 100 years," says Jennifer McCallister, MD, professor of Internal Medicine and associate dean for Medical Education at the College of Medicine. "Together we've solidified our unwavering commitment to educating the next generation of experts and innovators who will work together to improve the health of all children."



Empowering medical residents and fellows to be agents of change and improvement

When medical residents and fellows choose to further their training at The Ohio State University College of Medicine, they immediately have a stake in patient safety and the quality of health care being delivered on one of the most comprehensive health science campuses in the country.

Quality improvement (QI) is purposefully built into the curriculum. While providing hands-on patient care as frontline providers, residents and fellows interact with all parts of the health care system. This makes them well suited to identify and address quality and patient care issues.

Scott Holliday, MD, associate dean for Graduate Medical Education (GME) and associate professor of Internal Medicine at the Ohio State College of Medicine, says one part of medical training is giving physicians the knowledge and experience to practice medicine. Another part is to teach them to know when something isn't quite right.

"They see and experience glitches in our complex system and they know when something is off," says Dr. Holliday. "We have a system in place that empowers them to report these glitches so they can be examined and remedied."

The House Staff Quality Forum (HSQF) was founded in 2013 and sets residents and fellows on a career path that embodies continual improvement in patient safety and quality in medicine.

Residents and fellows from all GME programs and specialties meet monthly to review patient safety event reports submitted by fellow residents and fellows, which identify an area of patient care or safety that needs attention.

"We discuss what happened, what should have happened and determine if there is an opportunity for improvement," says Amber Clevenger, GME quality program outcome manager.

Kyle Stinehart, MD, is a third-year pulmonary and critical care medicine fellow and HSQF member. His group of fellows noticed that patient transition practices into and out of the medical intensive care unit (MICU) were inconsistent. Quality reports reviewed at HSQF and a survey of an interdisciplinary group of nurses, respiratory therapists and other stakeholders echoed their concern.

The group noted that since patients coming into the MICU are critically ill by definition and demand complex care, the handoff from one care team to the next needs to be comprehensive to avoid errors and decrease duplication of work.

"Our team of fellows is building on a process that was adapted in the surgical intensive care unit a few years ago to work with an interdisciplinary team to standardize this process in the MICU," says Dr. Stinehart. "All of this has been through a collaboration with HSQF."

Another HSQF member, Benjamin Rausch, DO, an anesthesiology resident, says he and his peers complete yearly group QI projects as part of residency training. In alignment with the emphasis on quality improvement, the anesthesiology residents utilized the Patient Safety Reporting System (PSRS) to identify more than 150 safety events and discovered most were deemed "good catches."

"A good catch is determined to be an event that was prevented because a member of the health care team spoke up," says Dr. Rausch. "The PSRS is not designed to be punitive, but to celebrate the good catches that prevent harm and point to areas that need further improvement."

The HSQF is a flagship program of Ohio State that elevates the level of education and training learners receive and use in future practice.

"We send one-third to one-half of our graduates out into practices around Ohio," says Dr. Holliday. "HSQF sets them up to engage in constant improvement."

Educating the next generation of **MEDICAL INNOVATORS**

Each and every day, The Ohio State University College of Medicine's 4,500 learners, nearly 2,400 faculty and thousands of staff members advance innovations and solve unrelenting medical and health care challenges. Education and training delivered in state-of-the-art classrooms and research facilities mold diverse and sought-after health science professionals. The breadth of programs brings together expertise, ideas and resources on a scale few other academic research institutions can match.

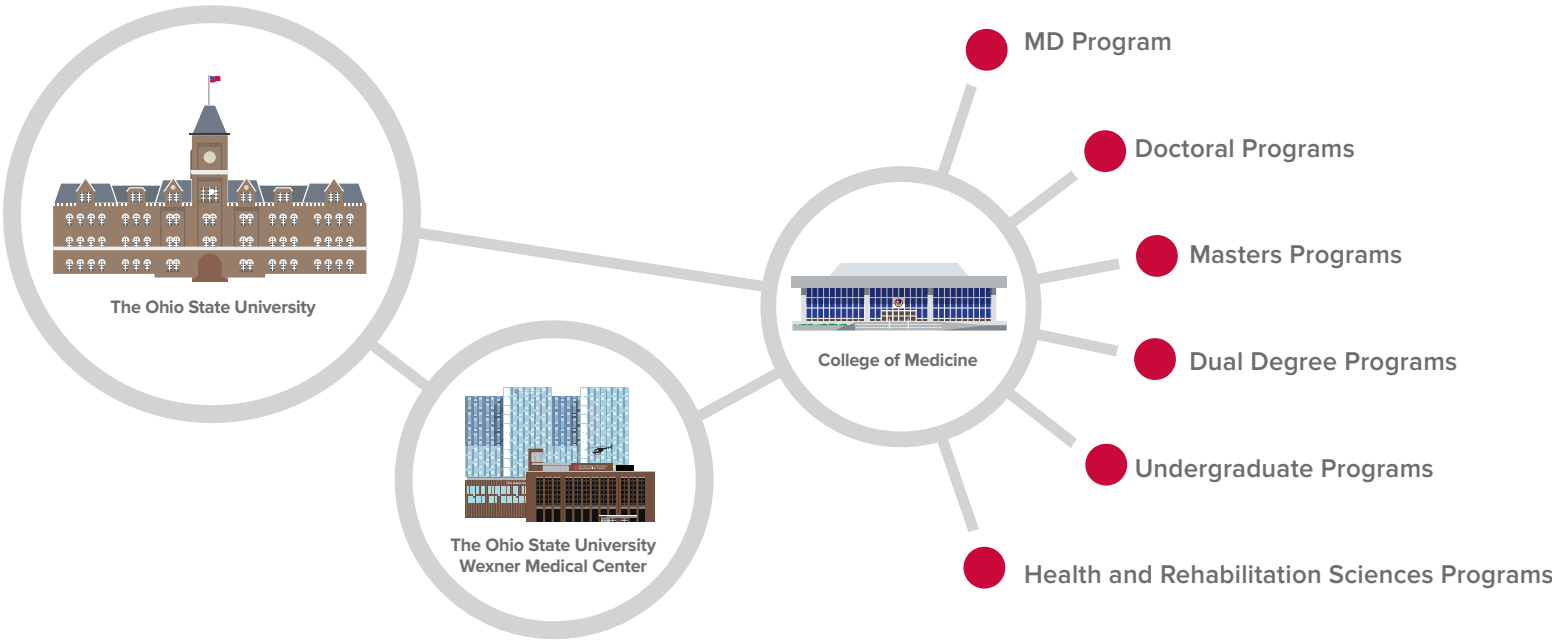


UNDERGRADUATE BIOMEDICAL EDUCATION

Ohio State is one of only a handful of universities in the country to offer an undergraduate major in biomedical science. This unique program of study incorporates traditional medical school courses with courses in critical analysis of research literature, laboratory techniques, social issues in medicine, health care policy and advanced multidisciplinary studies of immunology/infectious disease, genetics/neuroscience and cancer. As early as freshman year, learners are involved in leading-edge biomedical research.

GRADUATE BIOMEDICAL EDUCATION

The Biomedical Science Graduate Program trains pre-doctoral students to think critically and to acquire the interdisciplinary proficiencies needed for future success in the rapidly evolving fields within biomedical sciences and biomedical research. In an umbrella program that includes faculty from multiple departments, students have the opportunity to explore 11 different areas of research: anatomy, biomedical informatics, cancer biology, cellular and molecular physiology, experimental therapeutics, genetics and genomics, immunology, microbial pathogenesis, molecular basis of disease, neurological and neuromuscular disorders and translational research.



MD PROGRAM

Under the leadership of Daniel Clinchot, MD, vice dean for Education, the MD program curriculum integrates foundational science with early patient interaction, care and clinical practice. Students are trained to work in complex systems of care and advocate for patients within those systems.

In addition to the traditional four-year MD program, the Ohio State College of Medicine offers a three-year primary care track. Students experience an accelerated curriculum and early integration into a primary or family medicine clinical site. Graduates are automatically ranked to match into the college's family medicine residency program.

DUAL DEGREE PROGRAMS

The college offers many dual degree programs that help learners go further, faster. This sets them up to serve the diverse and changing needs of patients and communities.

MD/PHD is for future physicians who concurrently pursue a PhD in biomedical sciences, neuroscience, biomedical engineering with other affiliate fields. Students are accepted into the Medical Scientist Training Program through the MD admissions process.

MD/MBA prepares future physicians to meet the business administration and financial challenges in the practice of medicine. Studies can be completed at Ohio State's renowned Fisher College of Business within five years of beginning study.

MD/JD prepares future physicians to meet the challenges of legal issues in health care. It's administered in conjunction with Ohio State's prominent Moritz College of Law and can be completed in six years.

MD/MPH simultaneously prepares future physicians to practice in traditional patient settings with the broader population health context. It's administered in conjunction with Ohio State's College of Public Health and can be completed within five years of beginning study.

MD/MHA prepares future physicians to meet the challenges of a rapidly changing health care system. The program typically is completed in five years, just one more year than the traditional MD.

DPT/PHD in physical therapy prepares clinicians for careers as an academic physical therapist or researcher.

OTD/PHD prepares students for academic positions in occupational therapy and rehabilitation sciences programs at research-centered universities.

MASTER'S DEGREE PROGRAMS

Whether the goal is to continue training or to advance your career, the college provides learners with a supportive environment, proven curriculum and seasoned mentors to help guide learners to success in a variety of medical fields:

- MS in anatomy
- MS in applied neuroscience
- MS in bioethics
- MS in genetic counseling
- MS in immunology and microbial pathogenesis
- MS in medical science



A leader in training health and rehabilitation science professionals for more than 55 years

The School of Health and Rehabilitation Sciences (HRS) in The Ohio State University College of Medicine, founded in 1966, has grown to be one of the largest providers of health care professionals in the nation, with more than 15,000 graduates making a global impact on health care.

The school’s approach to learning is rooted in hands-on, interprofessional education and experiences. HRS students participate in numerous learning opportunities alongside students and faculty from nine other professional programs to understand the roles and responsibilities of everyone on the health care team and prepare for working with a diverse community in their future careers. This educational approach builds a climate of mutual respect and trust, improves communications and increases proficiency in designing interprofessional plans of care — ultimately improving patient outcomes.

From didactic classroom learning and laboratory work, to simulations and clinical rotations, the School of Health and Rehabilitation Sciences delivers comprehensive, evidence-based training and prepares more than 600 students a year to be the next generation of health care professionals and leaders.



ACADEMIC PROGRAMS

3
CERTIFICATES

Assistive and Rehabilitative Technology
Medical Laboratory Science
Usability and User Experience in Health Care

Master of Dietetics and Nutrition
Master of Respiratory Therapy
Master of Science in Health & Rehabilitation Sciences
Clinical Doctorate of Occupational Therapy
Clinical Doctorate of Physical Therapy
PhD in Health and Rehabilitation Sciences

6
GRADUATE

AS to BS Completion Degree in Radiologic Sciences
Athletic Training
Health Information Management and Systems
Health Sciences
Medical Dietetics
Medical Laboratory Science
Radiation Therapy
Radiography
Respiratory Therapy
Sonography

Aging
Integrative Approaches to Health and Wellness
Medical Laboratory Science

3
MINORS

2021 U.S. News & World Report Rankings

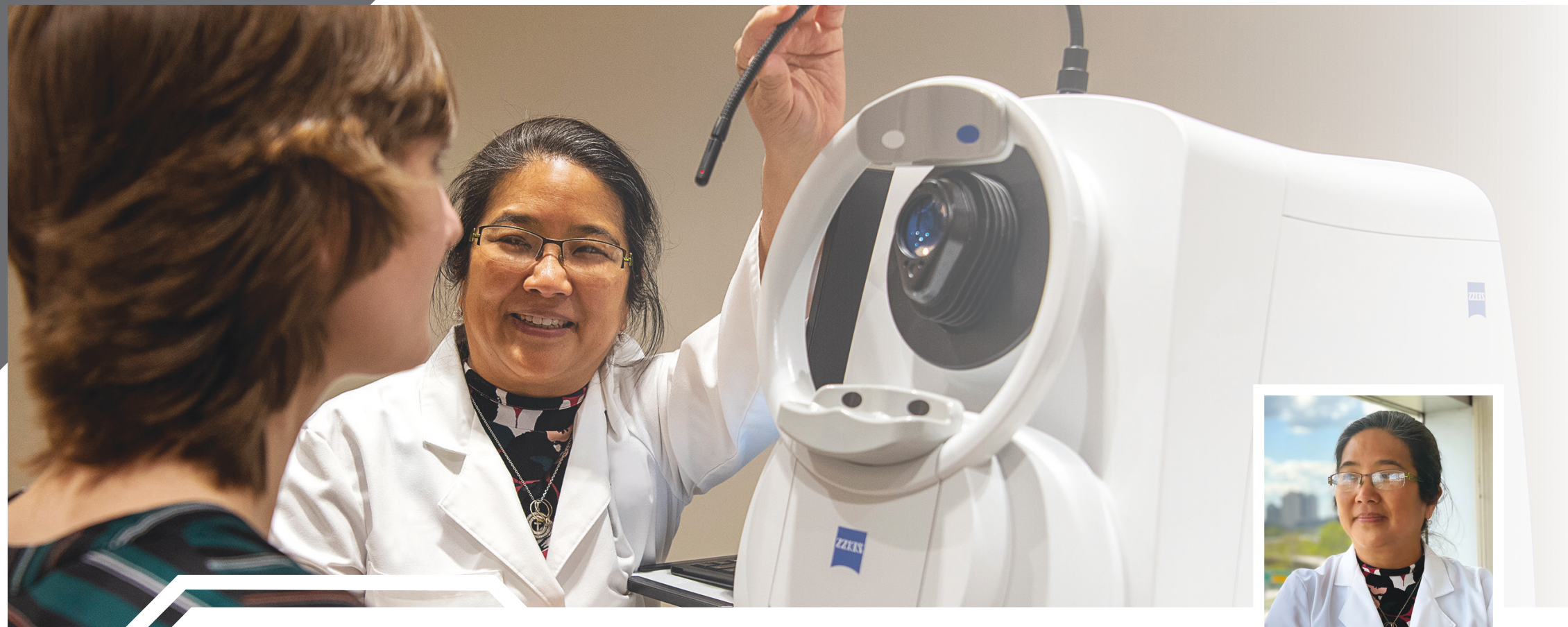
Best Online Bachelor Program – Health Sciences #4
Best Graduate Program – Physical Therapy #9
Best Graduate Program – Occupational Therapy #13

#4
#9
#13

2020-2021 HRS MILESTONES:

- The Master of Respiratory Therapy program obtained CoARC Provisional Accreditation as the first advanced practice clinical master’s degree for respiratory care in the nation.
- Four new programs launched — Master of Dietetics and Nutrition, AS to BS Completion Degree in Radiologic Sciences, Assistive and Rehabilitative Technology Certificate and the Usability and User Experience in Health Care Certificate.
- Michele Basso, EdD, PT, director of Research for HRS and professor, received a \$1.25 million grant from the Department of Defense for her work titled “Eccentric motor training with neuromodulation and biomarkers for rehabilitation readiness in subacute SCI.”
- John Bolte, PhD, Injury Biomechanics and Research Center director and professor, received the Arnold W. Siegel International Transportation Safety Award.
- Amy Darragh, PhD, OTR/L, Occupational Therapy Division director and professor, and Jill Heathcock, PhD, MPT, associate professor in the Division of Physical Therapy, helped establish C-PROGRESS, the National Pediatric Rehabilitation Research Center.
- Jennifer Garvin, PhD, MBA, HIMS division director and associate professor, was named a fellow of the American Heart Association.
- Kevin Evans, PhD, RT, Radiologic Sciences and Therapy division director and professor, was elevated to fellow status with the American Institute of Ultrasound in Medicine.





Leading the nation in **VISION HEALTH** and **GLAUCOMA MANAGEMENT**

As one of the leading glaucoma clinician-scientists in the nation, Sayoko Moroi, MD, PhD, professor and chair of the Department of Ophthalmology and Visual Sciences at The Ohio State University College of Medicine, has spent much of her 35-year medical career diagnosing, treating and researching glaucoma.

The one question that patients continue to ask that fuels her push toward new discovery is “Doctor, will I go blind?”

“You have to be brave when facing the grim reality that, despite advances in medications and surgery, 10% of patients with glaucoma will still lose their sight,” says Dr. Moroi. “When you lose vision, you lose independence and, often with that, hope.”

Dr. Moroi’s own father was diagnosed with glaucoma while she was in medical school. Throughout her

career at Duke University Eye Center, the University of Michigan and now Ohio State, Dr. Moroi has contributed to more than 40 research projects that span glaucoma pharmacology, genetics, patient outcomes and eye pressure variability. She studies how various patient populations differ in their susceptibility to a particular disease or their response to a specific treatment to create solutions to disease management.

A new study with Raymond Gao, PhD, associate professor of Ophthalmology and Visual Sciences and Biomedical Informatics at the Ohio State College of Medicine, aims to determine how individual patients respond to particular treatments by applying the known genetic risk factors of glaucoma and accounting for factors that regulate eye pressure, like fluid production, fluid drainage and venous pressure.

Sayoko Moroi, MD, PhD, Chair, Department of Ophthalmology and Visual Sciences

Intraocular pressure (IOP) is a known risk factor associated with glaucoma. The good news is, maintaining a steady state of IOP, which is largely a function of aqueous humor (AH) dynamics, can control glaucoma.

“This is dependent on a delicate balance between AH production, or inflow, and the rate of AH egress, or outflow, from the eye,” says Dr. Moroi. “Identifying those patients who have large eye pressure fluctuation is an important step in working to control it.”

In another study, funded by the National Institutes of Health, Dr. Moroi and her team, which includes

You have to be brave when facing the grim reality that, despite advances in medications and surgery, 10% of patients with glaucoma will still lose their sight.

researchers at the Mayo Clinic and the University of Nebraska, examine physiological factors that regulate eye pressure which could lead to patients being profiled for risk of blindness using a combination of standard glaucoma tests and genetic tests.

Through yet another study, funded by the National Science Foundation, Dr. Moroi and a team of engineers from the University of Michigan are imaging eye drainage areas and studying biomechanical tissue properties to develop a “drainage map” of an individual patient with glaucoma.

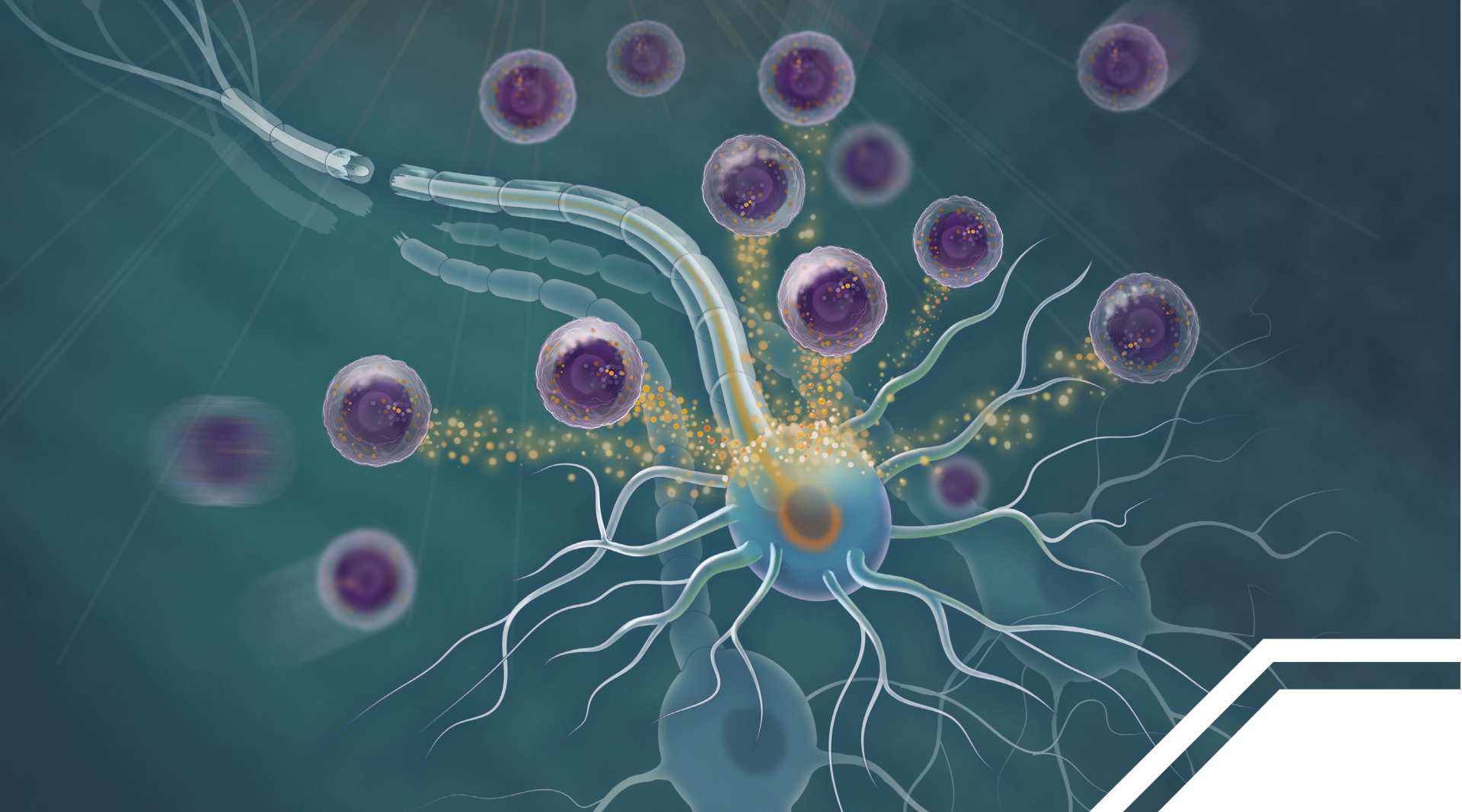
Dr. Moroi has been working to increase access to health care by growing her department’s teleophthalmology program. Teleophthalmology employs medical equipment designed for taking ocular images along with telecommunications technology so that primary care clinicians and emergency departments can screen patients for diabetic retinopathy, sickle cell retinopathy and glaucoma.

Under Dr. Moroi’s leadership, the department has implemented new clinical models for glaucoma care, including a drive-through IOP clinic and patient access to a home monitoring system that gathers eye pressure data using the Icare HOME tonometer.

Dr. Moroi and her team are constantly collecting large datasets from genetic studies, health records, imaging and biomedical tissue studies. She recently submitted a research proposal to fund the development of a Data Science Division that would use artificial intelligence and machine learning to automate analytical model building.

“This would allow us to carry out research tasks with more accuracy and at greater speed,” says Dr. Moroi. “And use data to help determine the ‘right’ glaucoma treatment algorithm for a given patient based on the disease stage, the type of glaucoma and the degree of IOP fluctuation.”

Each step they take toward preventing glaucoma-related blindness is a monumental step forward for patients — like her father — living with the disease.



AT OHIO STATE, PROMISING RESEARCH COULD CHANGE THE LIVES OF THOSE SUFFERING FROM DEVASTATING NEUROLOGICAL CONDITIONS

If there’s one thing people who suffer from neurological diseases and injuries are looking for, it’s hope. So when news breaks about a research development that holds great promise for regenerating damaged nerve fibers in the central nervous system — something that’s never been done in humans before — the emails and calls start flooding in.

Andrew Sas, MD, PhD, can attest to that.

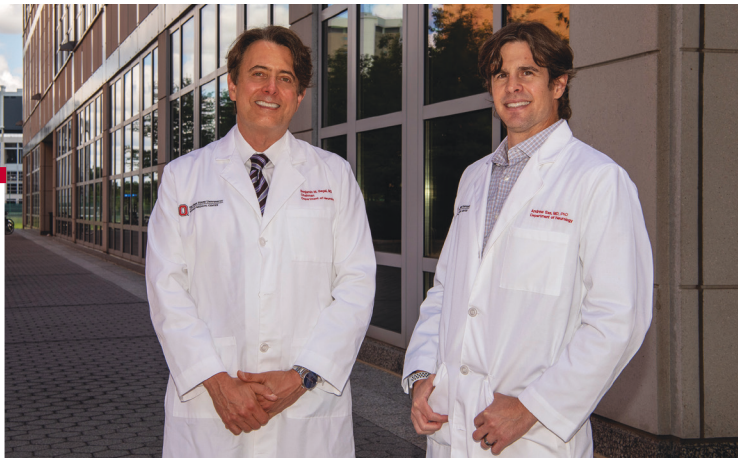
“These family members are very engaged in the scientific community,” says Dr. Sas, an assistant professor and physician-scientist in the Department of Neurology at The Ohio State University College of Medicine. “A lot of

them are searching for better treatment than what they currently have. They’re always looking for an opportunity to be part of new clinical trials and therapies, and I don’t blame them.”

In late 2020, the emails started arriving after Ohio State announced that researchers here and at the University of Michigan — including Dr. Sas and Benjamin Segal, MD, professor and chair of the Department of Neurology at the Ohio State College of Medicine and co-director of the Ohio State Wexner Medical Center’s Neurological Institute — had discovered in a mouse model a new type of immune cell that not only rescues damaged nerve cells from death, but partially reverses nerve fiber damage.

Finding Neurology’s ‘HOLY GRAIL’

This is a pursuit of neurologists and neuroscience researchers globally. My whole career, this has been the holy grail.
— Benjamin Segal, MD



Benjamin Segal, MD Andrew Sas, MD, PhD

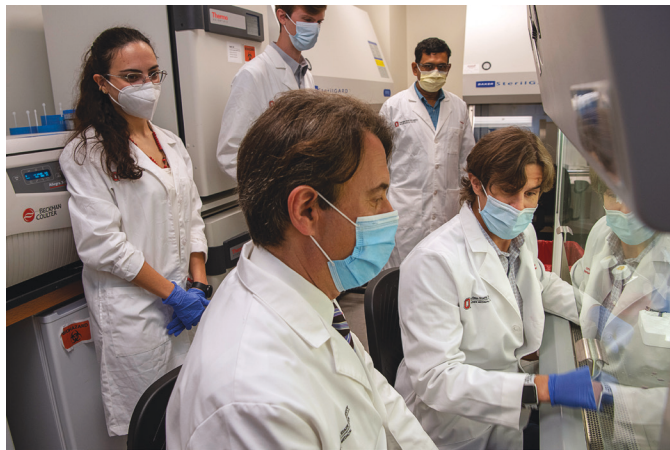
Led by Dr. Segal, the research team also identified a human immune cell line with similar characteristics that promotes nervous system repair.

To Dr. Segal, one of the world’s foremost experts in multiple sclerosis and neuroimmunology, it was an astonishing breakthrough — one he’s been chasing his entire career.

“This is a pursuit of neurologists and neuroscience researchers globally,” he told a Chicago television station. “My whole career, this has been the holy grail.”

This “holy grail” is a unique cell among granulocytes, which are a type of white blood cell. Neutrophils, the most common granulocytes, normally help the body fight off infection. The unique cell type resembles an immature neutrophil but is distinctive in possessing neuroprotective and neuroregenerative properties. Researchers demonstrated the therapeutic potency of the immature neutrophils subset by injecting them into mice with crushed optic nerves or lacerated nerve fibers in the spinal cord. Mice injected with the new neutrophil subset grew new nerve fibers.

Continued on page 30



Continued from page 29

Since publishing their findings in the journal *Nature Immunology*, the researchers have moved from mouse models into human cell work with “promising” early results, Dr. Sas says. “We’re doing the things everyone asked us at the end of 2020,” when news broke of the lab’s discovery and patient queries started pouring in. “It looks like some of the things we’re seeing in the mouse model are holding up with early human immune cell studies.”

Dr. Segal sees a future where patients with diseases as diverse as multiple sclerosis, Alzheimer’s, ALS and Parkinson’s, as well as patients with brain and spinal cord trauma, finally see some of the hope that has so far been elusive.

“There’s a wealth of data that’s been generated that’s really enhanced our understanding of neurological diseases and is leading the way to better testing and treatment,” Dr. Segal says. “All of this information is just on the verge of being translated to the bedside. I think the next several years — the next decade and beyond — is just going to explode with innovations at Ohio State.”

This discovery was a major step for a department that Dr. Segal has transformed since joining Ohio State in 2019. Colleagues say he’s built considerable depth into nearly every area within the Department of Neurology while also forging multidisciplinary clinics that span departments and elevating research across the organization.

“He has an interest in education, in our clinical mission and in our research, and he really works tirelessly in all three areas,” says Miriam Freimer, MD, professor of Neurology and director of the Division of Neuromuscular Disorders. “I think the next five years are going to be exciting for Ohio State Neurology.”

Of particular excitement is Dr. Segal’s focus on finding new ways to infuse research throughout his department and strengthen a robust state-of-the-art biorepository and brain bank through a practice of regularly collecting patient samples for investigators to study. He’s also fostering innovative connections between clinicians and scientists through a consultative committee for scientists who want to investigate whether findings in animal models translate in human diseases — creating a portal for clinicians to better translate research into bedside treatments.

“I’m trying to get the whole department and its divisions involved in particular research questions and projects,” Dr. Segal says.

An example: He’s introduced a research aspect into the neurology residency program and paired each resident with a research mentor. Residents have three years to take on a research project — anything from a simple case series to something more complex.

One resident approached Dr. Segal to say he was interested in measuring a particular molecule in the blood of patients with Guillain-Barré syndrome. Dr. Segal challenged him to pursue that interest and take it even further, using blood and spinal fluid samples to analyze inflammation in a way that’s never been done. The project is now a team effort that includes multiple residents and Neuromuscular faculty members and has established a seamless system of obtaining patient consent to collect and study samples. The resident was awarded an internationally competitive grant to fund this project.

For this and future research, Dr. Segal says, “The whole machinery is now in place.”

In Dr. Segal’s lab, Dr. Sas and others are continuing their work exploring the regenerative power of immune cells — a different avenue than stem cells, which many have tried unsuccessfully to use for the same purpose. Dr. Sas believes the field is heading toward more human research, and Dr. Segal’s lab in particular will be one to watch. “The work that we’re doing in the Segal lab,” Dr. Sas says, “is cutting edge — and has the chance to produce completely novel therapies.”



Steve Oghumu, PhD

When surveyed, an estimated 165 million — 60.2% — of Americans reported using alcohol, tobacco and/or drugs within the last 30 days. Studies show that while men are more likely to use drugs and alcohol and have higher rates of usage, women are more susceptible to craving and relapse.

“Women are generally more vulnerable than males to the initiation, escalation and withdrawal effects of substance abuse,” says Steve Oghumu, PhD, assistant professor of Pathology at The Ohio State University College of Medicine. “This difference has largely been attributed to hormonal differences. However, the mechanisms underlying sex chromosome influences on substance abuse behavior represent a huge gap in our knowledge base on the epigenetics of substance use disorders.”

While several factors, including environment and mental health disorders, can lead a person from abuse to addiction, one of the leading factors is genetics — which can account for 40% to 60% of a person’s risk. Certain genes can impact the development of the rewards center in the brain, predisposing certain people to increased serotonin levels that cause the pleasurable effects of alcohol or drugs to be intensified.

Understanding how the X chromosome impacts the rewards center is the focus of Dr. Oghumu’s research. Recently, the National Institute on Drug Abuse awarded him a \$2.3 million Director’s Pioneer Award (NDPA) to investigate the role of the epigenetic mechanism of X chromosome inactivation on sex differences in susceptibility to addiction. The NDPA supports individual scientists of exceptional creativity who propose highly

innovative and broadly impactful research toward the ultimate goal of enhancing human health.

“We believe that escape from X-chromosome inactivation, or XCI, in females contributes to sex-associated differences in addiction behavior,” says Dr. Oghumu.

XCI is an epigenetic mechanism that occurs in mammalian females and serves to equalize gene expression between the sexes. Females have two X chromosomes (XX); during XCI, one X chromosome is randomly chosen to be transcriptionally silenced. However, it is known that a number of X-linked genes escape XCI and display biallelic gene expression.

Dr. Oghumu and his research collaborators in addiction, neuroscience, genetic mouse modeling, bioinformatics and biostatistics will determine the molecular landscape of XCI in brain tissue and specific neuronal cells during chronic exposure to opioids and psychostimulants, using a highly innovative single cell RNA sequencing technology. Then, they will use cutting-edge mouse models, developed in his lab, to characterize the gene expression of specific X-linked genes associated with addiction to opioids and psychostimulants.

“This innovative approach to the study and analysis of gene-specific XCI escape as an epigenetic mechanism in the context of substance abuse has the potential to open up a new area of research on the epigenetics of addiction,” says Dr. Oghumu. “Further, these genetically modified mice can be used to study XCI escape as an epigenetic mechanism in other neurologic disorders.”



Targeting tobacco:

Using science to support regulatory and cessation efforts

No one has to remind Ted Wagener, PhD, and his colleagues at The Ohio State Wexner Medical Center's Center for Tobacco Research (CTR) about the urgency of their work.

"Tobacco use is tied to lung disease, cancer and heart disease — some of the leading causes of death in the United States and around the world," says Dr. Wagener, an



A researcher observes someone using a tobacco product inside a state-of-the-art negative pressure lab at Ohio State's Center for Tobacco Research. This technology allows scientists to monitor biofeedback in real time to better understand the potentially harmful effects of vaping.

associate professor of Internal Medicine in The Ohio State University College of Medicine who also directs the CTR. "Our multidisciplinary center is enabling us to not only understand and intervene in tobacco use and its effects on negative health outcomes, but to extend our study results to the community for the benefit of all."

Dr. Wagener believes this work is even more pressing as new tobacco products — such as electronic cigarettes (e-cigs), waterpipes (hookahs) and heat-not-burn products (heated tobacco products) — are continually being developed and marketed with little regulatory oversight or scientific knowledge of potential harm to consumers.

Recognizing the need for collaborative, evidence-based tobacco research, The Ohio State University Comprehensive Cancer Center — Arthur G. James Cancer Hospital and Richard J. Solove Research Institute (OSUCCC — James) created the CTR in 2020 to consolidate the university's tobacco research programs.

Our work clearly demonstrates that the addition of flavors and sweeteners to hookah tobacco is a key reason why youth and adults smoke this very harmful product.

— Ted Wagener, PhD



Theodore Wagener, PhD, is the director of the Center for Tobacco Research at The Ohio State University Comprehensive Cancer Center — Arthur G. James Cancer Hospital and Richard J. Solove Research Institute. The Center supports research scientists from a myriad of backgrounds — from psychology to biochemistry to regulatory reform — to put science behind the regulation of tobacco products and encourage cessation.

Through the CTR, tobacco experts from many disciplines — including psychology, epidemiology, biostatistics, environmental health, health communications, chemistry, biochemistry, cancer biology and law — conduct research aimed at increasing scientific knowledge to help regulate tobacco products in a way that best serves individual and public health interests.

Dr. Wagener, a licensed psychologist who specializes in health psychology/behavioral medicine and co-leads the Cancer Control Program at the OSUCCC — James, focuses his research on tobacco regulatory science, evaluating the behavioral, pharmacological and toxicological effects of cigarette and non-cigarette tobacco products such as e-cigs and hookahs. He also develops and tests motivational, enhancement-based smoking cessation and secondhand smoke-reduction interventions for children of parents who smoke.

His current research examines how youth, young adults and adults use e-cigs; how e-liquids affect the way nicotine is delivered to the brain and other organs; and whether there are ways to reduce e-cigs' abuse potential for youth but still have them be effective in helping adults stop smoking.

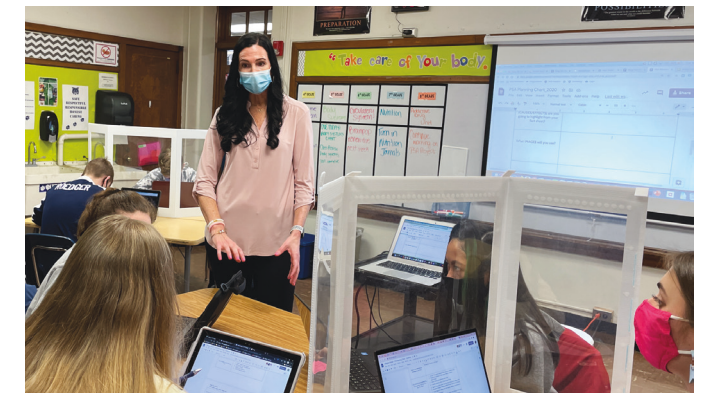
He's particularly concerned about regulators and public health officials striking the right balance in their regulation of e-cigs.

"The emergence of high nicotine e-cigs presents a dilemma for regulators. While these e-cigs have proven appealing and addictive to youth, emerging evidence suggests they may be even more capable than earlier e-cig models at helping adults stop smoking and exposing users to the lowest levels of harmful chemicals," Dr. Wagener says. "Our research seeks ways

to address this dilemma so we can provide regulators with the science needed to make evidence-based decisions for improving public health."

Dr. Wagener's lab also studies the impact of flavors and sweeteners on the initiation and maintenance of hookah smoking, and the possible impact on hookah use among youth and adults if flavors and sweeteners were banned.

"Our work clearly demonstrates that the addition of flavors and sweeteners to hookah tobacco is a key reason why youth and adults smoke this very harmful product," he adds. "Chemically, flavors and sweeteners also increase the delivery of addictive nicotine from these products, making it even more likely that youth and adults will use them again."



Educator Becky Lee has observed the spike in e-cigarette use among her students in recent years but is hopeful that efforts like hers to offer conversation and education on vaping risks are leading more teens to make healthier choices.

Dr. Wagener says regulators should move quickly to restrict flavors and sweeteners from all combustible tobacco products, including hookah, an assertion firmly backed by the urgent work of the CTR.



Ohio State researchers name
19 genes associated with
**HEART MUSCLE
DISEASE**



Researchers believe most of DCM has a genetic background, and at least 30% of people with dilated cardiomyopathy (DCM) have a family member with the disease.

RESEARCHERS AT THE OHIO STATE UNIVERSITY COLLEGE OF MEDICINE LED AN INTERNATIONAL GROUP OF EXPERTS THAT WORKED TOGETHER TO CLASSIFY 19 GENES ASSOCIATED WITH DILATED CARDIOMYOPATHY (DCM) AS HAVING HIGH IMPACT ON THE HEART MUSCLE DISEASE.

Researchers believe most of DCM has a genetic background, and at least 30% of people with DCM have a family member with the disease. First-degree family members (daughters, sons, brothers, sisters and parents) of a patient with DCM are encouraged to undergo genetic testing for the disease. However, current genetic testing panels analyze dozens, sometimes hundreds of genes, and they often have limited scientific support, making genetic results clinically difficult to interpret.

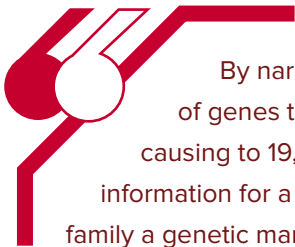
“When we get results back for a patient with dilated cardiomyopathy, we often see multiple variants in multiple genes. For many genes, we don’t know how strongly they’re associated with the condition,” says Elizabeth Jordan, MS, a genetic counselor in the Department of Internal Medicine at The Ohio State University College of Medicine, and lead author on the study published in the American Heart Association journal *Circulation*. “By narrowing down the number of genes thought to be disease causing to 19, we can better use genetic information for a diagnosis and

give the family a genetic marker to test family members not showing any signs of the disease to, ideally, find who is at risk before they develop DCM.”

DCM is a condition in which the heart muscle weakens and the left ventricle enlarges. It’s the most common cause for patients needing a heart transplant and is responsible for about half of heart failure cases.

For the yearlong study, Stephanie Schulte, MLS, head of research and education services at the Health Sciences Library at The Ohio State University, helped develop an initial list of 267 genes after examining various databases. Jordan, along with Ohio State researchers Laiken Peterson, MS, and Ray Hershberger, MD, narrowed the list down to 51, which was evaluated by an international panel of genetic counselors, cardiologists and laboratory scientists.

They used a method developed by the National Institutes of Health (NIH) Clinical Genome Resource (ClinGen) to determine which genes were most



By narrowing down the number of genes thought to be disease causing to 19, we can better use genetic information for a diagnosis and give the family a genetic marker to test family members not showing any signs of the disease to ideally, find who is at risk before they develop DCM.

— Elizabeth Jordan, MS

strongly associated with DCM. The research was funded by the NIH’s National Human Genome Research Institute and the National Heart, Lung, and Blood Institute.

“The researchers evaluated clinical data in humans as well as experimental data in animal models to determine the likelihood that a gene had a role in the disease,” Jordan says. “Because we often see uncertain genetic results with dilated cardiomyopathy, our hope is that our findings will aid in the interpretation of results of large genetic testing panels, which should help genetic information be more useful in clinical care.”



Grants over **\$2 MILLION:** 2020-2021

\$28,664,940

Raphael Pollock, MD, PhD, professor of Surgery, received a cancer center support grant from the National Cancer Institute. Based on scientific merit, the grant will support improvement in operations and development of new methods to prevent, diagnose and treat cancer.

\$5,500,000

Peter Mohler, PhD, chief scientific officer for the Wexner Medical Center; Micah Berman, JD, associate professor of Public Health and Law; Marielle Brinkman, BS, professor of Epidemiology; Matthew Gorr, PhD, MS, BS, assistant professor in the College of Nursing; Richard Gumina, MD, PhD, associate professor of Internal Medicine; Thomas Hund, PhD, MS, professor of Biomedical Engineering and interim director of the Dorothy M. Davis Heart and Lung Research Institute; Elizabeth Gardner Klein, PhD, associate professor of Health Behavior and Health Promotion; Bo Lu, PhD, professor of Biostatistics and Statistics; Joseph Paul McElroy, PhD, senior biostatistical scientist; Julianna Nemeth, PhD, assistant professor of Health Behavior and Health Promotion; Megan Roberts, PhD, assistant professor of Health Behavior and Health Promotion; Peter Shields, MD, professor of Internal Medicine; Abigail Shoben, PhD, Cancer Control research program; Kristin Stanford, PhD, associate professor of Physiology and Cell Biology; Theodore Wagener, PhD, associate professor of Internal Medicine and Psychology; Dylan Wagner, PhD, associate professor of Psychology; and Loren Wold, PhD, professor of Physiology and Cell Biology in the colleges of Nursing and Medicine, received a grant from the American Heart Association for “A comprehensive approach to understanding and ending youth e-cigarette addiction.”

\$5,340,477

Janice Kiecolt-Glaser, PhD, Distinguished University Professor of Psychiatry, Psychology, Health Behavior and Health Promotion and director of the Ohio State Institute for Behavioral Medicine Research; Rebecca Andridge, PhD, associate professor of Biostatistics; Christin Burd, PhD, associate professor of Molecular Genetics; and Douglas Scharre, MD, professor of Neurology and

Psychiatry, received a grant from the National Institute on Aging for “Spousal dementia caregivers: Risk for accelerated aging.”

\$5,154,331

Rebecca Jackson, MD, professor of Internal Medicine; Michelle Naughton, PhD, MPH, professor of Internal Medicine; and Electra Paskett, PhD, professor of Internal Medicine, received an award from the National Heart, Lung, and Blood Institute to support the Women’s Health Initiative Regional Center.

\$4,971,854

Theodore Wagener, PhD, associate professor of Internal Medicine and Psychology; Chad Bennett, PhD, co-director of Medicinal Chemistry; and Andrew May, PhD, MS, assistant professor of Civil, Environmental, and Geodetic Engineering, received a grant from the Food and Drug Administration for “Smoking machine adapter design project for ENDS, cigars, and heated tobacco products.”

\$4,534,432

Chien-Liang Lin, PhD, professor of Neuroscience, received a grant from the National Institute on Aging for “Development of a small-molecule that enhances tripartite synapses for Alzheimer’s disease.”

\$4,162,494

Oliver Adunka, MD, professor of Otolaryngology – Head and Neck Surgery, and Jason Riggs, PhD, AuD, research scientist in the Department of Otolaryngology – Head and Neck Surgery, received a grant from the National Institute on Deafness and Other Communication Disorders for “Clinical utility of residual hearing in the cochlear implant ear.”

\$3,996,000

Julie Niedermier, MD, professor of Psychiatry and Behavioral Health, and Julie Teater, MD, associate professor of Psychiatry and Behavioral Health, have been awarded an Addiction Medicine Fellowship from the Health Resources & Services Administration.

\$3,952,831

Ann McAlearney, ScD, MS, professor of Family and Community Medicine; Eugene Oltz, PhD, professor and chair of Microbial Infection and Immunity; Ashish Panchal, MD, PhD, professor of Emergency Medicine; Daniel Bachmann, MD, associate professor of Emergency Medicine; Prosper Boyaka, PhD, professor of Veterinary Biosciences; Seuli Brill, MD, associate professor of Internal Medicine; Soledad Fernandez, PhD, professor of Biomedical Informatics; Megan Gregory, PhD, assistant professor of Biomedical Informatics; Richard Gumina, MD, PhD, associate professor of Internal Medicine; Luanne Hall-Stoodley, PhD, associate professor of Microbial Infection and Immunity; Courtney Hebert, MD, assistant professor of Biomedical Informatics; Daniel Jones, MD, professor of Pathology; Eben Kenah, PhD, associate professor in the College of Public Health; Shan-Lu Liu, MD, PhD, professor of Microbiology; Gerard Lozanski, MD, professor of Pathology; Maciej Pietrzak, PhD, assistant professor of Biomedical Informatics; Richard Robinson, PhD, associate professor of Microbial Infection and Immunity; Linda Saif, PhD, MS, Distinguished University Professor of Veterinary Preventive Medicine; Cynthia Sieck, PhD, MPH, assistant professor of Family and Community Medicine; Anastasia Vlasova, DVM, PhD, assistant professor of Veterinary Preventive Medicine; and Jacob Yount, PhD, associate professor of Microbial Infection and Immunity, received support from the National Cancer Institute for the “Center for serological testing to improve outcomes from pandemic COVID-19 (STOP-COVID).”

\$3,825,567

Rajendar Deora, PhD, associate professor of Microbial Infection and Immunology; Purnima Dubey, PhD, associate professor of Microbial Infection and Immunity; Amy Lovett-Racke, PhD, associate professor of Microbial Infection and Immunity; and Xueliang (Jeff) Pan, PhD, assistant professor of Biomedical Informatics, received a grant from the National Institute of Allergy and Infectious Diseases for “Identification of novel immunogenic proteins from Bordetella pertussis.”

\$3,786,212

Sumithira Vasu, MBBS, associate professor of Internal Medicine, received a grant from the National Institute of Allergy and Infectious Diseases for “MIDAS: Microangiopathy, endothelial Damage in Adults undergoing Stem cell transplantation.”

\$3,707,189

Amal Amer, MD, PhD, professor of Microbial Infection and Immunity; Stephanie Seveau, PhD, associate professor of Microbial Infection and Immunity; Luanne Hall-Stoodley, PhD, associate professor of Microbial Infection and Immunity; and Xiaoli Zhang, PhD, MS, assistant professor of Biomedical Informatics, received a grant from the National Heart, Lung, and Blood Institute for “The role of the non-canonical inflammasome in innate immunity.”

\$3,548,316

Karl Obrietan, PhD, professor of Neuroscience, received a grant from the National Institute on Aging for “Alzheimer’s disease pathogenesis and the desynchronization of cortico-limbic circadian rhythms.”

\$3,300,773

Craig Bryan, PsyD, ABPP, professor of Psychiatry and Behavioral Health and director of the Division of Recovery and Resilience, and Narasimham Parinandi, PhD, associate professor of Internal Medicine, received a grant from the United States Army Medical Research Acquisition Activity for “Brief cognitive behavioral therapy (BCBT) replication trial.”

\$3,234,422

Ray Hershberger, MD, professor of Internal Medicine, and Daniel Kinnamon, PhD, research assistant professor of Internal Medicine, received a grant from the National Heart, Lung, and Blood Institute for “Precision medicine for dilated cardiomyopathy-cardiac magnetic resonance to identify early family phenotypes.”

\$3,201,288

Stephanie Gorka, PhD, assistant professor of Psychiatry and Behavioral Health; Katherine Brownlowe, MD, assistant professor of Psychiatry and Neurology; Craig Bryan, PsyD, ABPP, professor of Psychiatry and Behavioral Health and director of the Division of Recovery and Resilience; Emil Coccaro, MD, professor of Psychiatry and Behavioral Health; and Sarah Janse, PhD, research scientist of Biostatistics, received a grant from the National Institute of Mental Health for “Neural mechanisms and predictors of an ultra-brief suicide prevention strategy.”

Continued on page 38

Continued from page 37

\$3,191,205

Amal Amer, MD, PhD, professor of Microbial Infection and Immunity; Estelle Cormet-Boyaka, PhD, professor of Veterinary Biosciences and director of the Cell Physiology and Biochemistry Core for Cure CF Columbus; Purnima Dubey, PhD, associate professor of Microbial Infection and Immunity; Stephanie Seveau, PhD, associate professor of Microbial Infection and Immunity; Eugene Oltz, PhD, professor and chair of Microbial Infection and Immunity; and Xiaoli Zhang, PhD, MS, assistant professor of Biomedical Informatics, received a grant from the National Institute of Allergy and Infectious Diseases for “Host responses to the pore-forming toxin Listeriolysin O.”

\$3,091,434

Maria Eugenia Ariza, PhD, assistant professor of Cancer Biology and Genetics, and Marshall Williams, PhD, professor of Cancer Biology and Genetics and Microbiology, received a grant from the National Institute of Allergy and Infectious Diseases for “Stress effects on virus protein-induced inflammation and sickness behavior.”

\$3,023,907

David Carbone, MD, PhD, professor of Internal Medicine; Mikhail Dikov, PhD, research scientist in the Translational Therapeutics Program; Dwight Owen, MD, MS, assistant professor of Internal Medicine; Alexandre Samouilov, PhD, research assistant professor of Internal Medicine; Daniel Spakowicz, PhD, assistant professor of Internal Medicine; and Lai Wei, PhD, research assistant professor of Biomedical Informatics, received a grant from the National Cancer Institute for “Targeting immunosuppressive adenosine in patients with metastatic non-small cell lung cancer.”

\$2,948,602

Stephanie Gorka, PhD, assistant professor of Psychiatry and Behavioral Health; Kinh Luan Phan, MD, professor and chair of Psychiatry and Behavioral Health; and Baldwin Way, PhD, associate professor of Psychology, received a grant from the National Institute on Alcohol Abuse and Alcoholism for “Trauma and neurobiological threat reactivity as risk factors for alcohol abuse in youth.”

\$2,913,570

Nicholas Denko, MD, PhD, professor of Radiation Oncology; Zihai Li, MD, PhD, professor of Internal Medicine; Mark Mitton-Fry, PhD, assistant professor of Medicinal Chemistry and Pharmacognosy; Ioanna Papandreou, PhD, assistant professor of Radiation Oncology; and Sakima Smith, MD, associate professor of Internal Medicine, received a grant from the National Cancer Institute for “Overcoming hypoxic resistance to anti-cancer therapy.”

\$2,833,180

Kevin Sweet, MS, LGC, professor of Internal Medicine, and Mira Katz, PhD, professor of Health Behavior and Health Promotion, received a grant from the National Cancer Institute for “A randomized controlled trial: Genetic counseling patient preference intervention via electronic health record portal vs. conventional genetic counseling for women at elevated risk for breast cancer.”

\$2,742,402

Joshua Englert, MD, assistant professor of Internal Medicine, received a grant from the National Heart, Lung, and Blood Institute for “Dissecting the molecular mechanisms of lung injury during mechanical ventilation.”

\$2,691,205

Kerry Rogers, MD, assistant professor of Internal Medicine; Jennifer Woyach, MD, professor of Internal Medicine; Gregory Behbehani, MD, PhD, assistant professor of Internal Medicine; Meixiao Long, MD, PhD, assistant professor of Internal Medicine; Gerard Lozanski, MD, professor of Pathology; Christopher Oakes, PhD, assistant professor of Internal Medicine and Biomedical Informatics; Maciej Pietrzak, PhD, assistant professor of Biomedical Informatics; Amy Stark, PhD, assistant professor of Internal Medicine; Pearly Yan, PhD, assistant of Internal Medicine; and Lianbo Yu, PhD, assistant professor of Biomedical Informatics, received a grant from the National Cancer Institute for “Targeted therapies for lymphoid malignancies.”

\$2,689,795

Dana McTigue, PhD, professor of Neuroscience, received a grant from the National Institute of Diabetes and Digestive and Kidney Diseases for “Spinal cord injury causes liver pathology and metabolic dysfunction.”

\$2,457,000

John Bridges, PhD, professor of Biomedical Informatics; Qin Ma, PhD, associate professor of Biomedical Informatics; and Electra Paskett, PhD, professor of Internal Medicine, received a grant from the National Cancer Institute for “Participant engagement and cancer genome sequencing (PE-CGS): Coordinating center.”

\$2,407,974

Darwin Conwell, MD, professor of Internal Medicine; Philip Hart, MD, associate professor of Internal Medicine; Zobeida Cruz-Monserrate, PhD, assistant professor of Internal Medicine; Somashekar Krishna, MD, MPH, professor of Internal Medicine; and Luis Lara, MD, professor of Internal Medicine, received a grant from the National Institute of Diabetes and Digestive and Kidney Diseases for The Ohio State University Chronic Pancreatitis Diabetes Pancreas Cancer (CPDPC) Clinical Center.

\$2,386,825

Emil Coccaro, MD, professor of Psychiatry and Behavioral Health; Stephanie Gorka, PhD, assistant professor of Psychiatry and Behavioral Health; David Kline, PhD, assistant professor of Biostatistics; and Samar McCutcheon, MD, assistant professor of Psychiatry and Behavioral Health, received a grant from the National Institute on Alcohol Abuse and Alcoholism for “Aggression and SEIP: Neural correlates during alcohol intoxication.”

\$2,372,020

Rosa Lapalombella, PhD, professor of Internal Medicine; James Blachly, MD, assistant professor of Internal Medicine; Amy Stark, PhD, assistant professor of Internal Medicine; Jennifer Woyach, MD, professor of Internal Medicine; Pearly Yan, PhD, assistant of Internal Medicine; and Lianbo Yu, PhD, assistant professor of Biostatistics, received a grant from the National Cancer Institute for “Understanding Richter’s transformation in the targeted therapies era.”

\$2,341,818

Haitao Wen, MD, PhD, associate professor of Microbial Infection and Immunity; Elliott Crouser, MD, professor of Internal Medicine; Zihai Li, PhD, professor of Internal Medicine; Qin Ma, PhD, associate professor of Biomedical Informatics; and Ken Oestreich, PhD, associate professor of Microbial Infection and Immunity, received a grant from the National Institute of Allergy and Infectious Diseases for “Targeting immune inhibitory molecule SUSD2 to reverse immunosuppression.”

\$2,337,948

Pei-Hui Lin, PhD, research associate professor of Surgery, and Brad Rovin, MD, professor of Internal Medicine, received a grant from the National Institute on Aging for “Muscle-kidney crosstalk in age-related kidney disease.”

\$2,325,580

Federica Accornero, PhD, professor of Physiology and Cell Biology, and Jacob Yount, PhD, associate professor of Microbial Infection and Immunity, received a grant from the National Heart, Lung, and Blood Institute for “Mechanistic characterization of a new master regulator of cardiac virus infections.”

\$2,313,487

Eugene Oltz, PhD, professor and chair of Microbial Infection and Immunity, and Patrick Leonard Collins, PhD, assistant professor of Microbial Infection and Immunity, received a grant from the National Institute of Allergy and Infectious Diseases for “Topological mechanisms of DNA break repair in lymphocytes.”

\$2,248,424

Jesse Kwiek, PhD, associate professor and vice chair for Undergraduate Education in the Department of Microbiology; Joan-Miquel Balada-Llasat, PharmD, PhD, professor of Pathology; Nicholas Funderburg, PhD, associate professor in the School of Health and Rehabilitation Sciences; and Matthew Sullivan, PhD, professor of Microbiology, received a preliminary award from the National Institute of Child Health and Human Development for “HIV/ART, low birth weight, and mortality in HIV-exposed uninfected children: A translational mechanistic study.”

\$2,218,200

Deliang Guo, PhD, professor of Radiation Oncology and member of the Translational Therapeutics Program; Xiaokui Mo, PhD, assistant professor of Biomedical Informatics; and Jose Otero, MD, PhD, associate professor of Pathology, received a grant from the National Cancer Institute for “Delineating how retinoic acids regulate lipid metabolism in glioblastoma and their resistance mechanisms.”

\$2,188,496

Xiaopei Huang, PhD, associate professor of Internal Medicine; Yiping Yang, MD, PhD, professor of Internal Medicine and director of Hematology; Benjamin Kaffenberger, MD, associate professor of Internal Medicine; and Sumithira Vasu, MBBS, associate professor of Internal Medicine, received a grant from the National Heart, Lung, and Blood Institute for “Role of macrophage polarization in multi-organ fibrosis of chronic GVHD.”

\$2,182,212

Jonathan Godbout, PhD, professor of Neuroscience; Candice Askwith, PhD, associate professor of Neuroscience; and Olga Kokiko-Cochran, PhD, assistant professor of Neuroscience, received a grant from the National Institute of Neurological Disorders and Stroke for “Chronic and evolving inflammation after traumatic brain injury: Microglial priming and neuropsychiatric complications.”

\$2,132,151

Yutong Zhao, MD, PhD, professor of Physiology and Cell Biology; Rama Mallampalli, MD, professor and chair of Internal Medicine; and Jing Zhao, MD, PhD, associate professor of Physiology and Cell Biology, received a grant from the National Heart, Lung, and Blood Institute for “ISGylation regulates lung endothelial inflammation.”

\$2,075,000

Hannah Choe, MD, assistant professor of Internal Medicine, and Parvathi Ranganathan, PhD, assistant professor of Internal Medicine, received a grant from the National Cancer Institute for “Targeting epigenetic regulation via Bromodomain and Extraterminal (BET) domain inhibition for treatment of GVHD.”



DELIVERING HOPE: Biomedical advances fuel growth and innovation for organ transplants

Since the first organ transplant was performed here in 1967, The Ohio State University has helped thousands of patients and their families navigate the life-altering journey that comes with preparing for and getting an organ transplant.

Faculty in the Ohio State College of Medicine conduct ongoing research resulting in biomedical discoveries that translate into treatments and interventions for organ disease and that provide excellent transplant outcomes above the national average. This gives patients of The Ohio State University Wexner Medical Center Comprehensive Transplant Center who have a failing heart, lung, kidney, liver or pancreas a second chance at life.

Since 2016, the Comprehensive Transplant Center has experienced 92% growth in the number of lives saved through organ transplantation. In April 2021, the center reached an impressive milestone, performing its 11,000th transplant surgery. Nationally recognized, the center is currently ranked No. 9 in the United States by volume for all organs transplanted.

Kenneth Washburn, MD, professor of Surgery and director of the Division of Transplantation Surgery at the Ohio State College of Medicine, also serves as the executive director of the Comprehensive Transplant Center. He leads a team that's investigating ways to not only improve immune system

acceptance of new organs, but repair organs deemed unsuitable for transplantation due to age, disease presence and injury that can occur during organ procurement.

"Our ability to increase organ transplants lies in the ability to rehabilitate and repair organs once considered unusable, so they can be used in transplantation," says Dr. Washburn. "We have an interdisciplinary team of physician-scientists with vast research expertise, millions of dollars in funding and game-changing technology to propel these biomedical discoveries forward."

IMPROVING LIVES THROUGH NEW DISCOVERIES

Bumgardner Transplant Immunology Lab

Every patient who receives an organ transplant has an immune reaction that can damage the organ or cause organ rejection. Ginny Bumgardner, MD, PhD, professor of Surgery at the College of Medicine and director of the Bumgardner Transplant Immunology Lab, is investigating immune response to develop immunotherapies to prolong survival of transplanted organs.

"While investigating new strategies for controlling the immune response, we've uncovered an immune cell that may predict a transplant patient's risk of developing antibodies that cause organ rejection," says Dr. Bumgardner.

COPPER Lab

Bryan Whitson, MD, PhD, is professor of Surgery, and Sylvester Black, MD, PhD, is associate professor of Surgery at the College of Medicine. Since 2012, they have co-directed Ohio State's COPPER Lab — the Center for Organ Perfusion, Protection, Engineering and Regeneration — which oversees clinical trials utilizing ex-vivo organ perfusion that places organs on a sterile circuit pump and perfuses them with medicine and nutrients while maintaining conditions that mimic the body's normal physiology. While on the pump, experts can assess organ function and viability and make modifications to repair or improve organ performance.

This breakthrough discovery led Ohio State to be the first transplant center in Ohio to perform an ex-vivo lung perfusion study in 2016 and the first ex-vivo liver perfusion study in 2019.

"First, we developed several novel therapeutics to inhibit and block inflammation," says Dr. Black. "Then we created the ability to make repairs at the cellular level, a molecular bandage if you will, that can prevent cellular death and organ dysfunction that can happen during organ procurement and preservation."

Schenk Transplant Immunology Lab

Austin Schenk, MD, PhD, assistant professor of Surgery at the College of Medicine, runs a lab that investigates transplant immune response, specifically T cell biology, to develop immunotherapies to prolong survival of transplanted organs. Because current state-of-the-art immunosuppression drugs do not ensure indefinite transplant survival, many are lost to chronic rejection years post-transplantation.

"We want to gain a deeper understanding of the basic immunologic mechanisms that cause allograft rejection so we can develop novel immunosuppressive strategies to keep transplanted organs functioning for a patient's entire lifetime," says Dr. Schenk.

Transplant Biorepository

Ohio State's Transplant Biorepository provides high-quality, clinically annotated samples from normal and diseased organs for all Ohio State-affiliated research. Founded in 2017, the lab has processed nearly 5,000 tissue samples, both normal and diseased, facilitating innovation and allowing investigators to vie for competitive grants and high-impact publications.

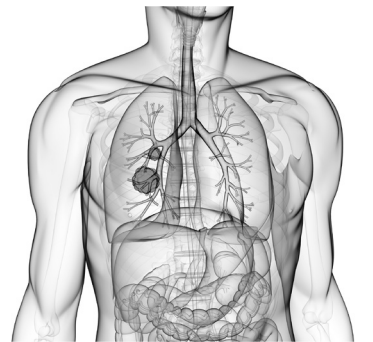
"Human tissue is in high demand for research, as animal models do not always yield accurate results," says Brenda Reader, PhD, lab director and senior research associate in the Division of Transplantation Surgery at the College of Medicine. "We support 12 separate investigators and outside research firms such as Battelle, Boehringer Ingelheim, Natera and CareDx."

REGIONAL EXPERTISE

COVID-19-related lung transplants

In December 2020, Ohio State's Comprehensive Transplant Center successfully performed the first double-lung transplant in central Ohio in

a patient recovered from COVID-19. Co-led by David Nunley, MD, professor of Internal Medicine at the College of Medicine and medical director for the lung transplant program, and Bryan Whitson, MD, PhD, professor of Surgery at the College of Medicine, they oversee a lung transplant team that's performed an additional seven COVID-19 lung transplants to date, with no deaths.



"Lung transplant recipients with previous COVID-19 infections have significant inflammation that can make the surgery more challenging than usual," says Dr. Nunley. "We've had 40-plus referrals, approximately 25% from out of state, after patients were turned down for transplant at other centers."

Transplant clinics

Consistently ranked as a top-20 transplant program in the nation, Ohio State is committed to improving access to quality liver, kidney and lung transplant evaluation and education through regional clinics. The first opened in 2017 in Dayton, and two additional clinics launched during the pandemic. A partnership with the Healthy State Alliance established locations at Mercy Health – St. Rita's Medical Center St. Rita's Medical Center in Lima and The Jewish Hospital in Cincinnati.

"The clinical growth has shown the need for innovation," says Dr. Washburn. "As a major academic health center, Ohio State has the resources, the commitment and the capability to identify matches and find new ways to make the most of every gift of life."



Vivien Lee, MD, professor in the Department of Neurology, performs a telestroke video consult with a patient being treated at a partner hospital.

10 years of innovations in TELESTROKE at OHIO STATE

Years before COVID-19 made telehealth commonplace for health care providers and patients, stroke neurologists and emergency medicine physicians were accustomed to using advanced telemedicine, called telestroke, for acute stroke treatment. Faculty at The Ohio State University College of Medicine are national leaders in stroke care, and The Ohio State University Wexner Medical Center was one of the first hospitals in the country — and one of only nine Ohio hospitals — to be designated a comprehensive stroke center by The Joint Commission and the American Heart Association/American Stroke Association.

“Telestroke saves lives by immediately increasing access to advanced stroke care in regions that don’t have neurovascular and neurosurgical physicians,” says Deepak Gulati, MD, assistant professor of Neurology at the Ohio State College of Medicine. “When someone is taken to an emergency department with stroke symptoms, experts are mobilized both there and at Ohio State through a ‘stroke alert.’”

May 2021 marked the 10th anniversary of the formation of Ohio State’s Telestroke Network, which delivers critical stroke expertise to patients and their care teams

across Ohio. Experts skilled at treating the most complex strokes and cerebrovascular diseases are ready to deliver around-the-clock emergent surgical and endovascular stroke treatment in more than 25 hospitals in Ohio. To date, more than 16,000 video consultations have been provided through the Telestroke Network.

Computed tomography (CT) scans, other real-time testing and patient interviews allow both the virtual and on-site teams to quickly identify bleeding and damage in the brain. Since only a small minority of stroke patients qualify to receive intravenous clot-buster medications or surgical removal or repair of clots to stop brain bleed, having expertise virtually in the room to explore options is critical to developing a treatment plan.

While some patients can successfully remain at their community hospitals to receive stroke care, others require advanced care or surgery

to remove clots and are transferred to the Ohio State Comprehensive Stroke Center.

Approximately 800,000 people in the United States suffer one of two kinds of stroke each year. Ischemic stroke occurs when a blood clot blocks a blood vessel in the brain, which injures brain tissue. Hemorrhagic stroke is caused by a blood vessel that bursts and bleeds into the brain.

Ohio State continues to advance the science and success of stroke treatments through collaboration and innovating the use of advanced technology. Experts are able to offer cutting-edge treatment in state-of-the-art facilities, such as a hybrid operating room that is outfitted with an interventional radiology suite and an operating table that is transparent to X-rays. The unique setup allows vascular neurologists, neurocritical care physicians and vascular neurosurgeons to provide emergency stroke care, both surgical and endovascular procedures, in the same room.

As the use of telemedicine continues to evolve and grow to meet the demands of 21st-century medical care, Ohio State will continue to lead advanced care to all patients across the region.



When someone is taken to an emergency department with stroke symptoms, experts are mobilized both there and at Ohio State through a ‘stroke alert.’



Ohio State transforms HEALTH CARE DELIVERY

By the time the COVID-19 pandemic was in full swing in the United States, The Ohio State University College of Medicine and The Ohio State University Wexner Medical Center were already embracing innovative advancements in technology and data sharing to improve patient care. The urgency of the global pandemic pushed many innovations that were already in the works to the top of the entire health care system's agenda.

The shift in care from the clinic to the couch not only drove the adoption of emerging diagnostic and assessment tools and access to shared data, it ushered in Ohio State's reinvention of their 21st century health system, to what is now being coined their health platform. This platform is centered on the patient and streamlines the many touchpoints and data inputs care teams add throughout a patient's health care journey. Ohio State's health platform redesigns health care using digital tools to deliver necessary care quickly and conveniently to patients wherever they are, along with technology aids that focus on proactive healthcare as well.

This comprehensive and safe delivery of care came not a moment too soon, says Arick Forrest, MD, MBA, medical director of Ambulatory Services for the Ohio State Wexner Medical Center, vice dean of Clinical Affairs for the Ohio State College of Medicine and president of The Ohio State University Physicians, Inc. It continues to transform providers' ability to deliver care that is responsive, transparent and convenient.

LEVERAGING DIGITAL HEALTH CARE

A health system, Dr. Forrest explains, involves a more traditional approach to health care. It's based on in-person care in a centralized facility network, often requiring patients to travel to different facilities on different days to meet with different specialists.

"Many of the innovations we've implemented in the pandemic will also become part of our care continuum post-pandemic, shifting to more innovative, creative care that engages patients more than ever before, making them a more integral part of their care team," he says.

TECHNOLOGY ENABLED CARE

Ohio State increased implementation of telehealth as the pandemic took hold, helping patients adhere to stay-at-home recommendations more easily and making them feel safer. But it also led to other patient benefits: no longer needing to manage transportation, parking, child care or time off work for these appointments. No-shows decreased for appointments, especially among Medicaid patients. It also gave rural hospitals throughout Ohio with smaller staff better access to specialized, expert Ohio State faculty.

Dr. Forrest points out that telehealth, which Ohio State did have available pre-pandemic, improved in many forms.

Now-expanded options include:

- Telehealth for more routine visits between providers and established patients
- Video visits for on-demand appointments, managed through a Telehealth Immediate Care center
- E-visits managed through the online patient portal MyChart
- Provider-to-provider telehealth through E-consults, expediting care within the Ohio State Wexner Medical Center and extending its nationally recognized care to regional hospitals

"Provider-to-provider telehealth has been especially helpful for more-rural hospitals with smaller staffs," Dr. Forrest says. "It gives them the ability to consult with our more-specialized experts, so that they can address their patients' conditions faster."

TECHNOLOGY AIDS PROACTIVE HEALTH CARE

Other platforms taking services to patients' home include new partnerships with DispatchHealth, the Alternate Solutions Health Network and Teladoc.

DispatchHealth delivers higher-acuity, in-home care with the goal of reducing emergency department visits and readmissions. Medical professionals take tools and treatments to patients, giving them urgent care-like services for injuries and illnesses from the common to complex.

The **Alternate Health Solutions Health Network** expands access to home health services for central Ohio patients by matching post-acute care coordinators with case management teams to safely transition patients to their homes for remote monitoring, helping reduce hospital readmissions and lengths of hospital stays.



Ohio State also partnered with **Teladoc** for its **Livongo for Diabetes** program, which gives participating patients a cellular-connected blood glucose meter, unlimited test strips, 24/7 interventional support and ongoing access to Teladoc Health professionals for individualized care.

INNOVATIVE CARE FOR COVID-19

"Remote monitoring is important, especially for patients with COVID-19, for keeping patients safe at home and keeping hospitals from filling up as fast," Dr. Forrest says.

Ohio State's COVID-19 patients, he says, can be discharged one to two days earlier, thanks to remote monitoring devices.

"These are patients who can safely go home but need to have their oxygen levels and breathing monitored. They're given strict guidelines to call us immediately if the monitors detect something concerning, and we're able to look at uploaded data to see their results ourselves. Combined with a video visit, we perform remote rounding, essentially."

This concept of remote care is also being applied to Ohio State's Post-COVID-19 Recovery Clinic, one of few clinics in the country devoted to treating patients with long-term COVID-19 symptoms.

"We're expanding to provide this to more patients throughout the region so that they can call in and talk to these subject matter experts in all different specialties," Dr. Forrest says. "The care begins with the patient's primary care provider, then experts are available to help address individual side effects. Pulmonary for chronic cough, Rheumatology for joint issues, ENT for taste disturbances, Neurology for brain fog and so on."

PLANNING FOR A POST-PANDEMIC FUTURE

The goal with many of these innovations, Dr. Forrest explains, is improving outcomes for patients by allowing them to become more engaged in their care.

"More-engaged patients means better outcomes for them — more-frequent interactions with their providers, more-accurate testing, more-effective treatments," he says. "You're less likely to wait six months to tell your doctor something's wrong."

"With these tools, we're reaching out weekly or even daily to many patients with chronic conditions, preventing them from needing the emergency department or hospital."



Lisa Hickman, MD, assistant professor of Obstetrics and Gynecology

Pelvic floor health clinic delivers cutting-edge individualized care

The Ohio State University College of Medicine has a message for the approximately one in four women in the United States with pelvic floor disorders: You do not have to suffer with pain. Ohio State has a group of specially trained faculty that deliver cutting-edge and innovative therapies designed to treat individual patients across the entire spectrum of pelvic floor dysfunction.

Pelvic floor disorders result when the muscles and connective tissues within the pelvic cavity weaken or are injured. The damage can result in lasting complex vaginal, urinary, bowel and pain problems.

Lisa Hickman, MD, assistant professor of Obstetrics and Gynecology at The Ohio State University College of Medicine and director of the Childbirth Pelvic Floor Disorders Clinic at The Ohio State University Wexner Medical Center, says while many women chalk up their problems to having children or getting older and think nothing can be done, there are many minimally invasive interventions and surgical techniques available.

“The Ohio State University is one of the few locations in the nation offering collaborative, multidisciplinary care for pregnant and postpartum women with pelvic floor symptoms,” says Dr. Hickman. “Bringing this level of patient-centered care to women is so exciting and rewarding.”

Dr. Hickman works alongside Andrew Hundley, MD, associate professor of Obstetrics and Gynecology, and Silpa Nekkanti, MD, assistant professor of Obstetrics and Gynecology, at the College of Medicine, to deliver

specialized care, including uterine-sparing surgical procedures.

“This is not cookie-cutter medicine,” says Dr. Hundley. “We evaluate each patient, their complaints and concerns related to quality of life and then come up with a care plan that allows them to achieve their goals in a way that is consistent with how they approach their own health care.”

Treatment may involve behavioral therapies and exercises to strengthen muscles. It can include both nonsurgical and surgical approaches to correcting anatomy. The team employs some of the newest therapies available, including office-based procedures for urinary incontinence and using Botox injections into the bladder, vaginal laser therapy, nerve stimulation and medical management.

“The goal is always to minimize risk and maximize speed of return to normal function,” says Dr. Nekkanti. “And to get patients back to doing what they love without embarrassment or pain.”

In 2021, Ohio State opened the new Childbirth Pelvic Floor Disorders Clinic, which provides specialized care during pregnancy and postpartum, prior to the traditional four to six week visit for women who experience severe tears during delivery or pelvic floor disorders during or after pregnancy. Patients have access to pelvic floor physical therapists, nurses, advanced practice providers and other specialists who provide a structured means for receiving specialized treatment. They can also receive ongoing counseling and education on their condition.

The **OHIO** STATE University FAST FACTS

As one of the largest universities in North America, The Ohio State University boasts more than 12,000 courses, over 160 undergraduate majors, 18 colleges and schools, and more than 200 academic centers and institutes. It's a land-grant, sea-grant and space-grant university and a member of the Association of American Universities. Ohio State is a top 12 public research university and is named one of the top 25 most innovative universities in the nation by *U.S. News & World Report*. In addition to the main campus in Columbus, there are six regional campuses throughout central Ohio. There are nearly 68,000 enrolled students and 7,000 faculty who call themselves Buckeyes.

All these brilliant minds, in hundreds of different disciplines, are just a few blocks away from one another. We've had medical researchers partner with linguistics, engineering, food science...the list is endless. They've had the chance to collaborate with the best minds in other fields — all at Ohio State.

— Peter Mohler, PhD,
Interim vice president for Research at Ohio State
Vice dean for Research at the Ohio State College of Medicine.

Booming Columbus

The Ohio State University College of Medicine is home to exciting new research, innovative health care delivery and unique, multidisciplinary education. Columbus, the city surrounding the university, has also grown and expanded with many exciting new developments.

A progressive community of big dreamers and bold thinkers

Columbus is a city unlike any other. Vibrant and alive, Ohio's capital is known for its open attitude, smart style and entrepreneurial spirit. Columbus neighborhoods, dynamic nightlife, noteworthy music scene, attractions, arts and culinary experiences are made unforgettable by the rich diversity of the community.

BIG

- The 14th-largest city in the U.S. and the second largest in the Midwest, behind Chicago
- The Columbus metro area is No. 1 in the Midwest for population, job and GDP growth

AFFORDABLE

- With a cost of living 11% below the national average, Columbus offers an affordable market for working professionals
- Columbus is among the top 10 metros in the U.S. for concentration of young professionals (age 25-34)

DIVERSE

- More than 130 nations and more than 100 languages are represented
- More than 41% of the residents identify as non-white
- Continually scored 100% on the Human Rights Campaign Foundation's Municipal Equality Index

THRIVING

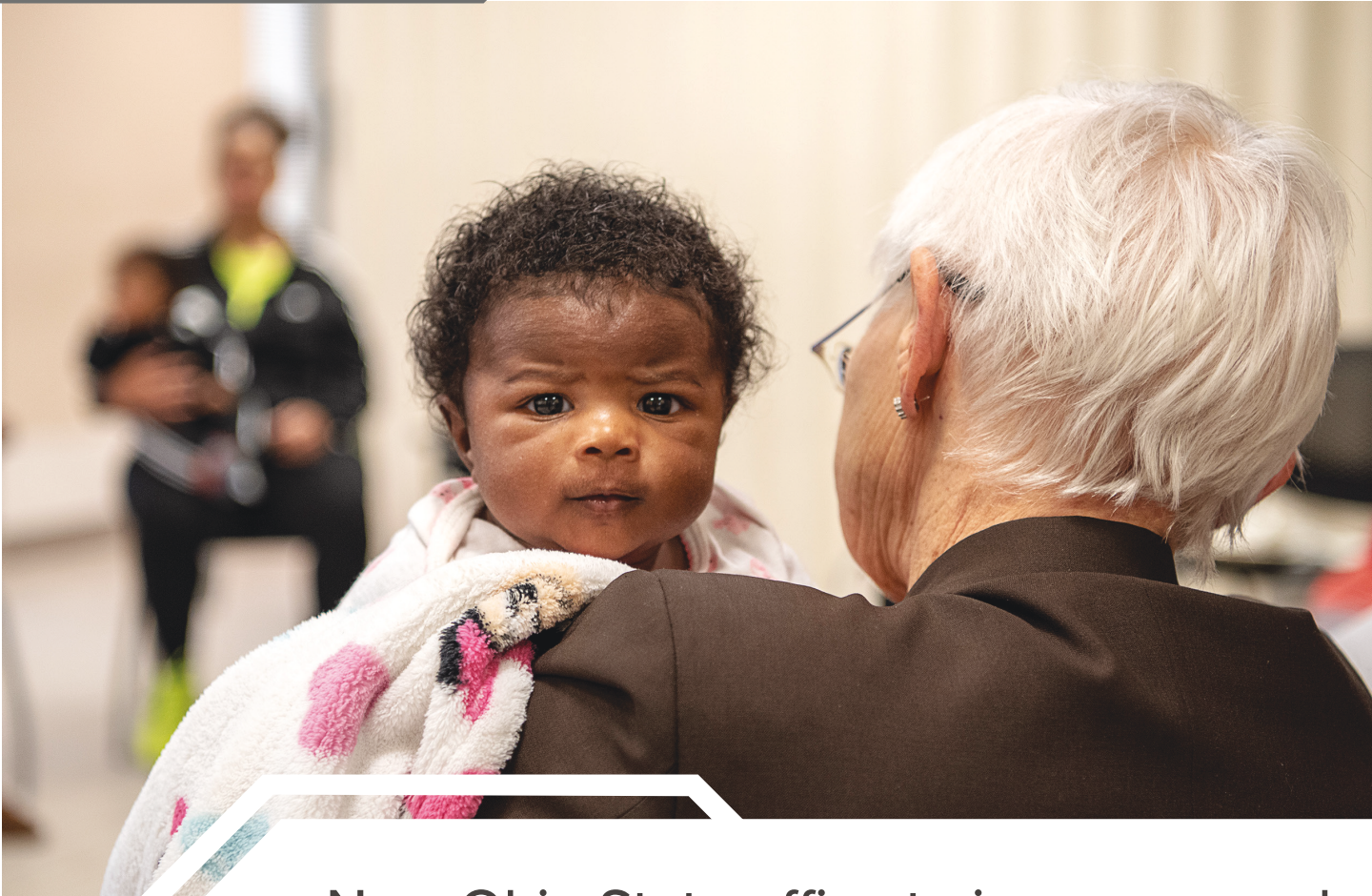
- Declared as one of the 10 Best Big Cities to Live in Right Now by *Time*
- Home to 20 Fortune 1000 headquarters, including five Fortune 500s
- No. 1 Top City for Rising Tech Start Ups by *Forbes* magazine
- Named one of the "30 Most Fun Places to Live in the U.S." by *U.S. News & World Report*

SMART

- Home to more PhDs than the national average, with the largest concentration in the Midwest
- More than 50 college and university campuses with more than 133,000 enrolled students
- In the past five years, Columbus has been named the world's most intelligent community by the Intelligent Community Forum and has won the U.S. Department of Transportation's Smart City Challenge

ACCESSIBLE

- The average commute is 23.8 minutes; Columbus has low traffic delays and congestion, making it easy to live and work in almost any area of the metro
- Over 400 metro and city parks and 230 miles of existing greenways trails
- Within 500 miles of nearly half of the U.S. population



New Ohio State office to increase reach, impact of **HEALTH EQUITY** efforts

As the largest land-grant institution in the state and the only academic health center in central Ohio, The Ohio State University has a responsibility to lead the way in reducing health care disparities in its communities and serve as a model for Ohio, and the nation. Located in Columbus, the 14th largest city in the country — which also sits in close proximity to Appalachia — The Ohio State University College of Medicine and The Ohio State University Wexner Medical Center are uniquely positioned to tackle the health care challenges of our state’s urban and rural residents, many of whom are considered underserved populations.

“We need more coordinated solutions focused on dismantling social determinants of health and reducing health disparities,” says Cheryl Lee, MD, chief health equity officer for the Ohio State Wexner Medical Center and chair of the Department of Urology for the Ohio State College of Medicine. “Together, we can effect structural and systemic change. We will fully engage

faculty, staff and learners across the medical center, The Ohio State University’s seven health science colleges and broader university community, along with community organizations, local, state and federal government agencies and other external stakeholders.”

BRINGING TOGETHER ALL AREAS OF CHANGEMAKERS

Ohio State has developed a multipronged approach to reduce health care disparities, knowing that we must make improvements at many levels to ensure that everyone in our communities have the opportunity to attain full health potential. This includes:

- Improving workforce diversity and interpersonal interactions among patients, learners and one another through bias-reduction training, anti-racism education and other resources
- Dismantling structural barriers at Ohio State that could limit the ability for staff, faculty, learners and/or patients to thrive



Cheryl Lee, MD, Chair, Department of Urology,
Chief Health Equity Officer

- Engaging the community, supporting community partners and advocating at a government level for policies and legislation that drive change to reduce health disparities
- Creating action plans that devise strategies to reduce specific health disparities each year

Dr. Lee points to long-established medical center initiatives to address specific disparities, such as Moms2B, which is reducing infant mortality rates in several neighborhoods across central Ohio. Then there is newer work, like Ohio State’s efforts in reducing disparities between Black and white patients undergoing colorectal cancer screening, as well as reducing disparities in flu and COVID-19 vaccine uptake among white and nonwhite residents.

Ohio State supports Partners Achieving Community Transformation (PACT) a partnership that started in 2010 with the City of Columbus, the Columbus Metropolitan Housing Authority and Near East Side stakeholders. Its goal is to create a healthy, financially and environmentally sustainable community where residents have access to safe and affordable housing, quality health care and education, and employment opportunities on the Near East Side of Columbus, Ohio. PACT has since created new, mixed-income, modern apartments as well as new low-income housing for seniors. Additionally, the PACT organization launched an exterior home repair grant program to help over 30 homeowners repair their homes for free.

Within the PACT footprint, the Wexner Medical Center is currently renovating a vacant library to create a Healthy Community Center, aimed at increasing access to healthful foods and nutrition education as a way to decrease obesity and chronic disease in the community. Opening in early 2023, the Healthy Community Center will include a fresh market, a retail café, a demonstration and teaching kitchen

and meeting spaces. Not only will the center offer services for healthy eating, but also job training for youth and adults.

“The funding is secured, the renovation of the building is beginning,” Dr. Lee says. “But we have to make sure the community is engaged as it’s built. How do we reduce barriers to people using that facility and translate what we do there into better health outcomes? That’s where it takes a diverse group of people from different backgrounds to develop real solutions, and having this office makes it easier to centralize our ideas and actions to optimize community health from every angle.”

The eventual goal, she says, is to extend our community outreach to create more partnerships and extend the initiatives’ success beyond central Ohio. “We have so many projects already in full swing, but I believe the Office of Health Equity, Diversity and Inclusion will expand the reach of these projects into new areas as we increase institutional awareness, augment resources and leverage new partnerships to make the work even more impactful. We want to translate discovery into community improvements.”

MAKING CHANGE WITHIN

The Ohio State College of Medicine is also home to the university’s health equity pillar as part of its campuswide RAISE initiative, which is short for race, inclusion and social equity.

RAISE is a five-year faculty hiring and retention initiative that’s working to build an academic community attentive to shifting demographics. Its goal is to add 50 new faculty members and 10 postdoctoral fellows across campus. This transformative strategic hiring initiative will build a world-class research program on social equity and racial disparities.

Dr. Lee serves as the director for the university’s Center for Health Equity and partners with the college’s department chairs to recruit health equity faculty through the RAISE initiative.





SEEING IS BELIEVING:

Medical student organization inspires area youth

While faculty in The Ohio State University College of Medicine are focused on training the next generation of medical leaders, our students are looking to mentor the generation after them. Despite coursework, exams and clinical work, second-year medical student Evans Osuji leads a student organization whose goal is to mentor and teach elementary, middle and high school students about being a doctor.

“It is humbling to look out and see the faces of children that remind me of myself at that age, many of whom have aspirations of being a physician like myself,” says Osuji. “I hope seeing medical students and physicians from many different cultures, ethnicities and socioeconomic statuses, who look like them, helps them envision being in our shoes.”

Osuji is president of the Ohio State student-run organization Health Education and Development Services for Underprivileged Populations, also known as HEADS-UP, which works with local nonprofits and schools to develop health literacy curriculums for

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students interested in medicine, improve health care literacy through education, mentor and offer resource support for children who are in educationally, socially and economically disadvantaged positions.

The organization’s 10-member executive board, along with their faculty advisor, enlists the help of medical students, residents and faculty physicians to present on various organ systems and other aspects of the health care field, so students understand the many options available.

Through an annual summer camp, diversity, equity and inclusion activities and a partnership with LeBron James’ I Promise School, leaders of HEADS-UP ignite a passion for medicine and provide a road map to students whose paths are far more uncertain and uncharted. HEADS-UP specifically designed a curriculum to teach I Promise fourth-grade students about the brain, bones and heart.

Chris Pierson, MD, PhD, associate professor of Pathology in the Ohio State College of Medicine and staff pathologist in the Department of Laboratory Medicine at Nationwide Children’s Hospital, especially enjoys volunteering with HEADS-UP during the summer camp held at Ethiopian Tewahedo Social Services.

“Watching them see a human brain for the first time is an unforgettable experience,” says Dr. Pierson. “They are amazed that this soft, squishy object is also what each of them uses to experience everything about their life.”



In addition, a newly organized mentoring program with Northland High School pairs HEADS-UP medical and graduate students and faculty from different specialties with high school students who’ve expressed interest in pursuing a career in medicine. Mentors advocate, guide and empower students to reach specific goals and reach their fullest potential. In addition, each month different faculty members present lectures and customized presentations and answer student questions.

Rosevine Azap, a third-year medical student and past-president of HEADS-UP, says having a multitude of mentors early on in her education changed her life and helped her take actionable steps toward pursuing her dreams.

“Knowing at a young age that I wanted to be a doctor cleared a path for me,” says Azap. “My mentors rooted for me every step of the way. I’m forever grateful for their support and encouragement. I couldn’t have made it this far without them.”

Azap adds that educational disparities often begin in elementary school. HEADS-UP believes their work will make an impact on the diversity of students trying to enter the pipeline into medical school.

“It’s going to take more than a few quick fixes to create a medical workforce reflective of the general population,” says Osuji. “That is why it is so important for us to share our passion and possibility.”



While COVID-19 caused many academic institutions to cancel expansion plans due to budget cuts, The Ohio State University committed to lead Ohio in health care expansion with a \$3 billion capital investment in education, research and patient care. As a result, Ohio State is transforming the way medical care is learned, advanced and delivered.

21st century medicine requires a comprehensive understanding of health that spans communities, specialties and technologies. Currently under construction are five new facilities that will advance medicine for central Ohio and beyond. These buildings will enable collaboration between learners, researchers and clinicians Ohio State's new health sciences education space is designed to engage learners through collaboration with one another in order to create health care solutions in the communities where they serve. A sixth building that opened in summer 2021 is already seeing the benefits of this expansion.



\$3 BILLION investment revolutionizes **HEALTH** education and care

NEW HOME FOR THE COLLEGE OF MEDICINE

The Ohio State University College of Medicine will be housed in the Interdisciplinary Health Sciences Center, a \$155.9 million multiphase project. It includes a 120,000-square-foot renovation of Hamilton Hall and construction of a new 100,000-square-foot building featuring an anatomy wing, slated to open in January 2022. Not only will digital and virtual anatomy resources be integrated

into laboratories, medical students will participate in collaborative learning experiences with advanced simulation technologies. The project will equip learners from the College of Medicine and the colleges of Dentistry, Nursing, Optometry, Pharmacy, Public Health and Veterinary Medicine with the skills necessary to practice 21st century medicine.

The Interdisciplinary Research Facility will serve as an anchor for Ohio State's Innovation District. It will house multiple research disciplines, including biomedical, life sciences, engineering and environmental sciences. Two floors will be dedicated to The Ohio State University Comprehensive Cancer Center, including its new Pelotonia Institute for Immuno-Oncology.



The Ohio State University Wexner Medical Center ushered in a new era of unprecedented and convenient access to primary and specialty care in July with the opening of the state-of-the-art **Outpatient Care New Albany** health center. Construction is underway on the **Outpatient Care West Campus** and **Outpatient Care Dublin** health centers and these facilities will offer patients high-quality care and easy access to Ohio State's nationally ranked experts right in their own neighborhood.



We are building state-of-the-art classrooms equipped with cutting-edge tools along with innovative research facilities and modern clinical spaces. This enriched, holistic education will enable learners, researchers and practitioners to continue to lead scientific discovery.

— Carol R. Bradford, MD, MS, FACS
Dean, The Ohio State University College of Medicine
Vice president for Health Sciences, The Ohio State University Wexner Medical Center

Patients can have multiple appointments with different health care providers at a single location, on the same day, allowing them to address all major health care needs, from prevention and diagnostic to surgery.

Another important feature is patient access to advanced immediate care. Think of it as access to emergency medicine without the cost, wait times or travel to a traditional hospital emergency department.

Through its new \$1.79 billion inpatient hospital scheduled to open in early 2026, construction of the **Hospital Tower** further unifies The Ohio State University Wexner Medical Center campus. The design positions health care providers to respond quickly to future pandemics or other health care crisis and provide complex patient care. The tower will be the centerpiece of a network of inpatient and outpatient facilities providing access to all communities in central Ohio and beyond.

The space will facilitate teaching multidisciplinary, team-based health care, adoption of new technology, research of new clinical treatments and the establishment of new evidence-based practices.

The tower doubles the amount of rooms available to 820 and provides private room settings fully equipped to elevate patient-centered care and accommodate the demand for high-acuity care.

"Faculty need flexible teaching spaces to optimize collaborative learning," says Carol R. Bradford, MD, MS, FACS, dean of the College of Medicine. "Today's physicians need modern tools, technology and functional spaces to provide innovative clinical care. This new medical complex is designed with them in mind."





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COLLEGE OF MEDICINE

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Together, we will reach our ambition of being
a leading college of medicine that transforms
the health of our communities through inclusive and
innovative education, discovery and care.

— Dean Carol R. Bradford, MD, MS, FACS



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