



Cleveland Clinic

GivingDoesGood



LITTLE BOOK OF BIG IMPACT 2022

MISSION: POSSIBLE



“The only way of discovering the limits of the possible is to venture a little way past them into the impossible.”

—ARTHUR C. CLARKE, AUTHOR

Discovering the limits of the possible is all in a day’s work at Cleveland Clinic. And with each passing day, the impossible feels more and more attainable. In the following pages, you’ll read about recent advances in patient care, research and education—all realized because of the generosity of our donors—that are opening new worlds of possibilities. You’ll also learn about our philanthropic priorities going forward. With your generous support, nothing is beyond our reach.

For an accompanying video of our Little Book of Big Impact, visit:
cle.clinic/MissionPossible



Space tourism is ready for liftoff, and NASA is planning to send astronauts to Mars in the next 15 years. First, though, we need a better understanding of the impact of space travel on the human body. To this end, a Cleveland Clinic donor collaborated with Cleveland Clinic earlier this year on an out-of-this-world research project. Entrepreneur-philanthropist Larry Connor was the pilot on Axiom Mission 1, the first private mission to the International Space Station. To measure the EFFECTS OF THE MICROGRAVITY OF SPACE on tissue structure within the brain and spine, Connor and his crew had X-rays and MRIs taken before and after their expedition to the ISS, 248 miles above Earth. In addition to offering a novel look into different facets of neurological health, the findings pave the way for larger studies to optimize the health of space travelers, according to Thomas Mroz, MD, Chair of Cleveland Clinic's Orthopaedic & Rheumatologic Institute. "The amount of groundbreaking research happening in this orbiting laboratory is really breathtaking," Connor said upon his return from the ISS. "I hope we've played a role—however small—in allowing future generations to have similar experiences."

Any diagnosis of cancer is scary, but for those who learn they have cholangiocarcinoma (CCA), a rare cancer in the bile ducts that connect the liver and gallbladder to the small intestine, the news is especially daunting. For patients with any stage of the disease, the five-year survival rate is about 9% to 10%. For patients with metastatic disease—when the cancer has migrated to other organs such as the liver—the five-year survival rate drops to 2%. Therapeutic options, and hope, have been in short supply—until now. Clinical trials at Cleveland Clinic helped lead to **TWO FDA-APPROVED DRUGS TO TREAT INOPERABLE, METASTATIC CANCER OF THE BILIARY TRACT**, research that would not have happened without backing from two passionate donors: the Porter family, who lost their mother to the swift and brutal cancer, and Lisa Craine, who is battling CCA herself. Few hospitals and academic centers study CCA, and GI cancers overall—tumors that start in the gastrointestinal tract or digestive system—receive limited philanthropic dollars. “For people affected with CCA,” says Alok Khorana, MD, Director of the Gastrointestinal Malignancies Program at Cleveland Clinic, “support from families and patient advocates is invaluable in making treatments available.”

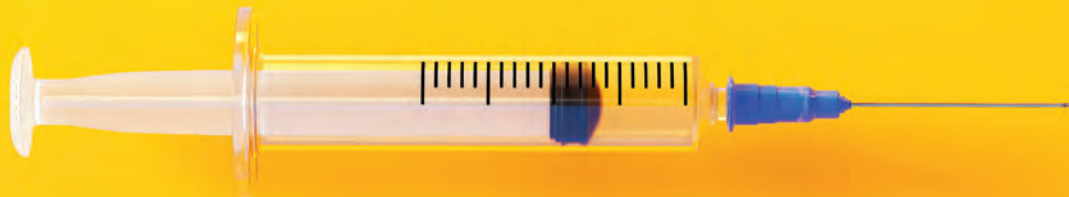




Can you pedal your way to better brain health? Can your Peloton help stave off Alzheimer's disease? What about Parkinson's disease? Using a home-based, internet-connected indoor cycle, Cleveland Clinic researchers Jay Alberts, PhD, the Edward F. and Barbara A. Bell Family Endowed Chair, and Stephen Rao, PhD, the Ralph and Luci Schey Chair, are investigating THE EFFECT OF LONG-TERM, HIGH-INTENSITY AEROBIC EXERCISE ON ALZHEIMER'S AND PARKINSON'S, the two most common—and fastest-growing—neurodegenerative diseases. Promising results from earlier, smaller studies helped Dr. Alberts and Dr. Rao land nearly \$10 million in federal grants to launch two trials: CYCLE (CYClical Lower Extremity Exercise for Parkinson's) and CYCLE-AD (Cycling to Cease or Limit the Effects of Alzheimer's Disease). While exercise appears to have a powerful effect on cognition, the challenges are to figure out the correct “dose”—how much activity is enough to make a difference—and to keep the workout interesting so people don't get bored and stop pedaling. “If we want exercise to be considered medicine,” says Dr. Alberts, “we need to figure out the right prescription for patients.”

While musculoskeletal injuries are widely recognized as occupational hazards in many fields, they remain a serious and underrecognized problem in the surgical suite, where long procedures and awkward postures often tax the bodies of surgeons. Even something as simple as wearing a surgical headlight can cause lasting damage. “It’s a very heavy weight on the top of the head that pulls it forward,” says Cleveland Clinic heart surgeon Douglas Johnston, MD, who has seen surgeons take time away from work or even early retirement because of musculoskeletal issues. Now Dr. Johnston and several colleagues have teamed up to tackle this problem. The S[erg]ICAL Project is the brainchild of six Cleveland Clinic caregivers—five surgeons from multiple specialties and a physical therapist—as well as an external ergonomic expert. With \$100,000 in philanthropic support—\$25,000 from the Hickey Family Foundation’s Innovation Impact Award and a \$75,000 Caregiver Catalyst Grant funded by hundreds of Cleveland Clinic donors—the team has developed a **NOVEL SURGICAL SUPPORT SYSTEM PROTOTYPE** and completed initial evaluations that helped demonstrate the promise of their approach.

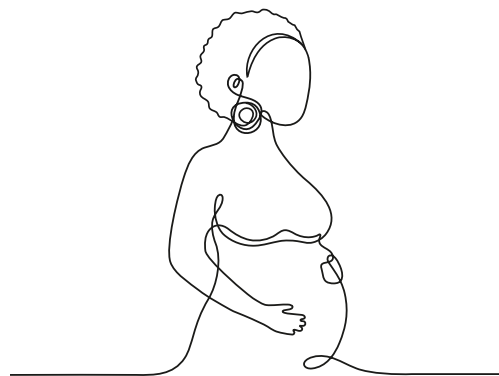




People aren't the only ones who retire. Proteins do, too—albeit not in hopes of traveling more or working on their golf game. Which got Vincent Tuohy, PhD, of Cleveland Clinic thinking: Could we zero in on retired proteins to create VACCINES FOR PREVENTING ADULT-ONSET CANCERS? In a word: Yes! Funded in part by philanthropic support from some 20,000 donors, Dr. Tuohy's research led to the invention of a vaccine aimed at potentially thwarting triple-negative breast cancer (TNBC), the most lethal form of the disease. A clinical trial is underway to test immune response to the vaccine, which targets a lactation protein found in most TNBCs—but not in the normal tissue of women beyond their childbearing years. Activating the immune system against this protein protected against breast tumors and prevented them from growing in preclinical models. Other vaccines could target other cancers via the “retired protein hypothesis” formulated by Dr. Tuohy, the Mort and Iris November Distinguished Chair in Innovative Breast Cancer Research. Vaccines for ovarian cancer and endometrial cancer are already in the works, and a similar approach might work against prostate cancer.

The idea of using robots in surgery remained the stuff of far-out sci-fi flicks until the late 1980s. Today, they're an integral part of care at Cleveland Clinic, where a team at the Glickman Urological & Kidney Institute performed the world's first **ROBOTIC SINGLE-PORT KIDNEY TRANSPLANT**. Amazingly, all surgical instruments and a donor kidney fit through one small cut measuring 4 centimeters—about the length of a AAA battery. Before undergoing the operation, Laura Bray, a working mom of three, was yoked to a dialysis machine for up to nine hours a day. The minimally invasive surgery lasted four hours. She was discharged two days later—with no need for painkillers. A gift of \$2 million to create an endowed chair generates roughly \$80,000 per year to underwrite the development of big ideas, such as this robot-assisted procedure. “This technique allows patients to regain their quality of life more rapidly,” says Georges-Pascal Haber, MD, PhD, Chair of Urology in the Glickman Institute. “Using the latest technology to help our patients live a full life is the true spirit of innovation which we foster here at Cleveland Clinic.”





When Cleveland Clinic Director of Nursing Operations Dusty Burke, MSN, RN, did the math, she was shocked: Between 20% and 33% of women have endured some form of sexual abuse. That meant that at Cleveland Clinic Fairview Hospital alone, as many as 1,800 of the 5,400 women who gave birth there in 2020 could have carried the pain of sexual violence into the delivery room. What if well-meaning doctors, nurses and midwives were doing things that triggered old wounds without even realizing it? For survivors of sexual assault and childhood sex abuse, “just taking your hand and placing it on a patient’s knee and talking with her can trigger her,” says Burke. She and her colleagues realized there was no standardized education for caregivers who come into contact with traumatized prenatal patients. So they applied for a Caregiver Catalyst Grant to create one. This year, women at all five Cleveland Clinic birthing hospitals in Ohio in need of TRAUMA-INFORMED CARE will partner with trained resource nurses who will learn their history, develop a plan with their labor and delivery team and help them welcome their babies into the world with joy.

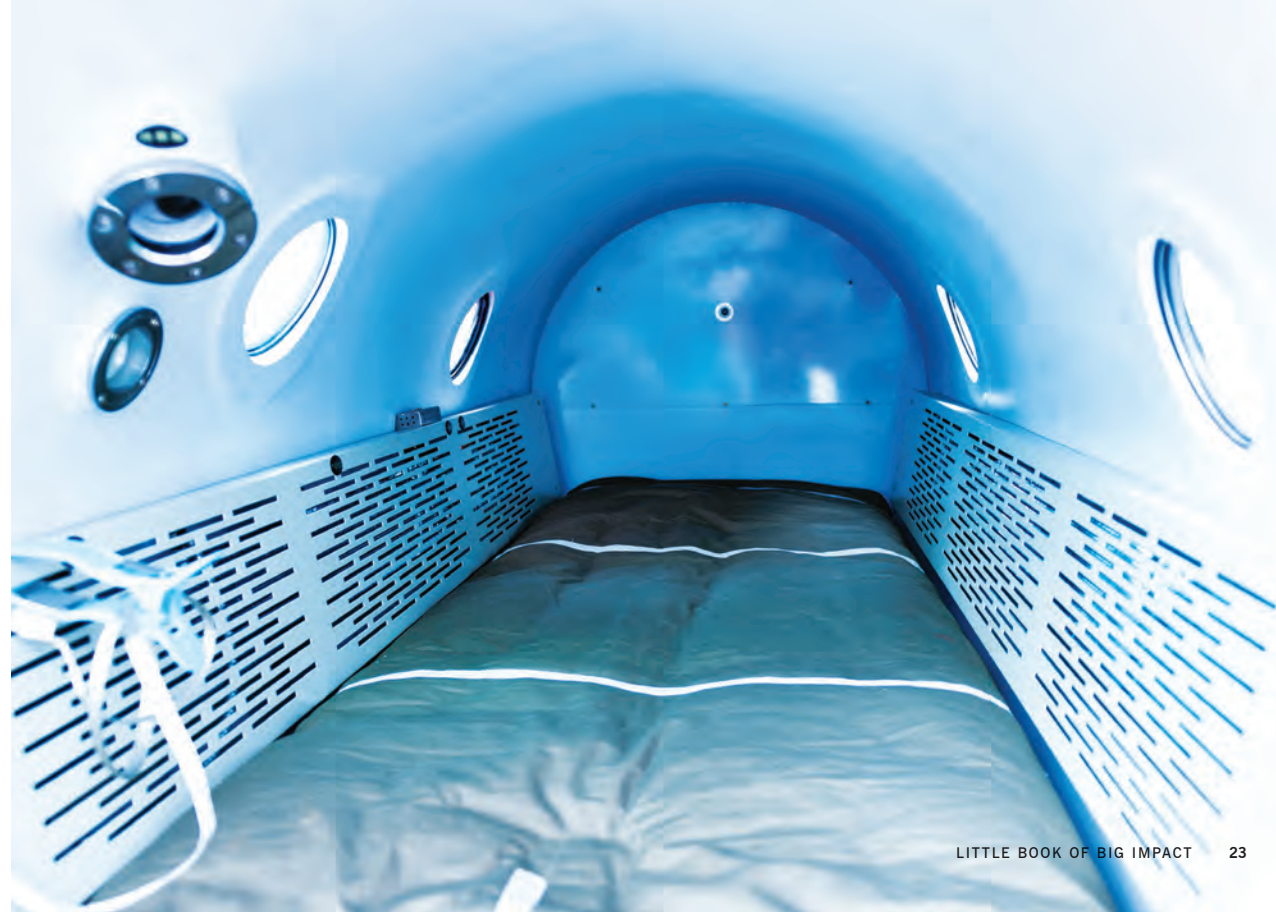
Time was of the essence. A malignant tumor was compressing the heart of the 26-week-old fetus, causing fluid to accumulate and cardiac function to deteriorate. “We needed to act quickly and decisively,” says Darrell Cass, MD, Director of the Fetal Surgery and Fetal Care Center at Cleveland Clinic. He led the multidisciplinary team of Cleveland Clinic and Cleveland Clinic Children’s surgeons and other caregivers that performed a fetal intrapericardial teratoma resection. The **RARE AND COMPLEX SURGERY** took 3½ hours. After the mother was anesthetized, a 12-centimeter opening was made in the uterus, the fetus’s arms were brought out to expose the chest and the tumor was successfully removed. The team then repositioned the fetus before closing the mother’s womb and abdomen. Ten weeks later, Rylan Harrison Drinnon was born, weighing 6 pounds, 4 ounces. “He simply would not be here today if our caregivers were not given the opportunity to think big,” says Bradley Marino, MD, the Ronald and Helen Ross Distinguished Chair in Pediatric Cardiology. Thinking big is made possible by the generosity of donors. Says Dr. Marino: “You help us push the envelope, take chances and show the world it can be done.”





Med school shouldn't be just about medicine. At the Cleveland Clinic Lerner College of Medicine, the MEDICAL HUMANITIES have enriched the curriculum for years, thanks to the longtime support of the John P. Murphy Foundation. In collaboration with local universities as well as the Cleveland Museum of Art, Lerner College of Medicine students study literature, history, art and other disciplines. They also have opportunities to connect with local residents via creative projects, building relationships that foster empathy. A new \$1 million gift from the John P. Murphy Foundation has established the John P. Murphy Fellowship in Medical Humanities at the Lerner College of Medicine. Fellows will conduct research to improve the school's medical humanities model; develop and expand partnerships with the community; and lead a medical humanities symposium. "An education in the medical humanities is essential to learning the practice of medicine and what it means to be a healer," says Bud Isaacson, MD, Executive Dean of the Lerner College of Medicine. "It allows students to better understand the human experience, which ultimately leads to more compassionate and empathic patient care."

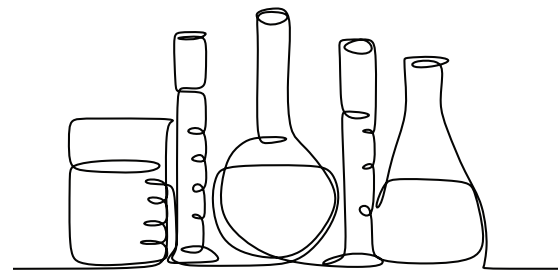
Remember when Michael Jackson reportedly napped in a hyperbaric oxygen chamber to combat aging? A photo of the King of Pop, supine in his glass sarcophagus, prompted sniggering tabloid headlines in 1986. Today, elite athletes like LeBron James and Michael Phelps aren't laughing. They're using **HYPERBARIC OXYGEN THERAPY** (HBOT)—breathing pure oxygen in a pressurized tent, tube or room to boost the oxygen level in their blood—to recover from everything from intense training to the rigors of playoffs. Others use HBOT to treat sick scuba divers (as a cure for “the bends”) and people with carbon monoxide poisoning, including firefighters and miners. With a \$2 million gift from the Lozick Family Foundation, Cleveland Clinic researchers are exploring new frontiers in HBOT for patients who had a stroke. While clinicians have been investigating the benefits of this therapy for wounds that won't heal and chronic bone infections, the Lozick family's philanthropic support will allow Cleveland Clinic to expand the scope of its research to study the effect of hyperbaric oxygen therapy on cognitive impairment, a novel approach that aims to improve the lives of post-stroke patients.





A lead is a special wire that delivers energy from a cardiac implantable electronic device (CIED)—e.g., a pacemaker or an implantable cardiac defibrillator—to the heart. If infection or damage occur, a procedure may be required to remove a lead. Electrophysiologist Bruce Wilkoff, MD, has performed more than 3,000 transvenous lead extractions over the course of his career, making him one of the world’s foremost authorities on the subject. To share his knowledge and to connect with others in this specialized field, Dr. Wilkoff envisioned an online forum where electrophysiologists around the globe and other professionals could compare notes on lead management. Created with philanthropic support, LEADCONNECTION.ORG has drawn more than 100,000 visits since its launch in 2015. “It gives electrophysiologists everything they need to deliver optimal care,” says Dr. Wilkoff, Director of Cardiac Pacing and Tachyarrhythmia Devices at Cleveland Clinic. “By getting everyone in one place with relevant information and having conversations about cases, disease processes, tools and problems, good ideas rise to the top, and those with basic flaws quickly disappear.”

A longer-lasting and more advanced flu vaccine that offers protection against multiple strains of the virus? It's not only a distinct possibility—it's a priority for Ted Ross, PhD, who holds the newly created role of Global Director of Vaccine Development at Cleveland Clinic. Dr. Ross, one of the world's preeminent vaccine researchers, is creating novel vaccine platforms for influenza and other infectious diseases such as COVID-19 and HIV. His work also has the potential to yield new treatments for virus-induced cancers. Dr. Ross is based at Cleveland Clinic's **FLORIDA RESEARCH AND INNOVATION CENTER** (FRIC) in Port St. Lucie. This leading-edge facility is a hotbed of medical discovery made possible by philanthropic support. In addition to advancing the study of autoimmune diseases, chronic inflammatory diseases, infectious diseases and cancer, the FRIC is dedicated to expediting discoveries out of the laboratory and delivering more effective therapeutics for patients. Dr. Ross and the rest of the FRIC staff are collaborating with colleagues from every corner of Cleveland Clinic, including the Global Center for Pathogen & Human Health Research, where the focus is on thwarting future pandemics.





For years, bioengineers tried to incorporate virtual reality (VR) into medical care. Progress stalled when patients reported dizziness and nausea triggered by a sensory conflict that happens when your brain thinks you're moving but your body is parked. Jay Alberts, PhD, the Edward F. and Barbara A. Bell Family Endowed Chair at Cleveland Clinic, found a fix: Infinadeck, an omnidirectional treadmill that allows users wearing VR headsets to naturally walk in any direction, eliminating motion sickness. Next, Dr. Alberts and his team built the CLEVELAND CLINIC VIRTUAL REALITY SHOPPING TASK, a first-of-its-kind immersive virtual environment to replicate everyday tasks that can cause people with Parkinson's disease to experience freezing episodes or fall. PD patients visiting Dr. Alberts' virtual grocery store can navigate aisles and reach for items on shelves while physicians assess their symptoms and software delivers objective and quantitative outcomes to fine-tune their PD therapy. "It provides unprecedented insight into how individuals with Parkinson's disease actually move in the real world," Dr. Alberts says. "This understanding will facilitate more precise, patient-specific treatment approaches."

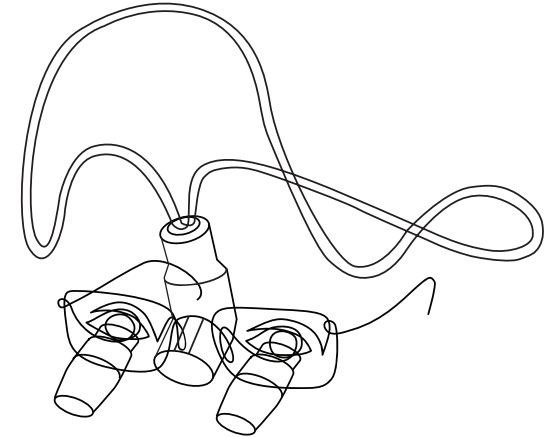
Did you know up to 40% of Alzheimer's disease cases can be prevented by lifestyle modifications, including diet and exercise? At the [WOMEN'S ALZHEIMER'S MOVEMENT PREVENTION CENTER AT CLEVELAND CLINIC](#), women receive customized recommendations for impactful change. When Maria Shriver's father was diagnosed with Alzheimer's, she learned all she could about the disease. The award-winning journalist discovered a startling statistic: 2 out of 3 people living with Alzheimer's are women. Shriver launched the Women's Alzheimer's Movement (WAM) to raise awareness about women's increased risk for Alzheimer's and other neurological diseases. She reached out to fellow Alzheimer's activist Larry Ruvo, who'd lost his father, Lou, to the disease, a trauma that spurred him to partner with Cleveland Clinic to build the Cleveland Clinic Lou Ruvo Center for Brain Health. Together, the friends shaped the vision for the world's first Alzheimer's prevention center for women, which opened in Las Vegas in 2020. The Women's Alzheimer's Movement at Cleveland Clinic is an expanded partnership focused on advancing gender-based research, treatment, prevention and education concerning Alzheimer's disease and other conditions involving the nervous system in women. Says Shriver: "Cleveland Clinic is dreaming as big as we are."





Melanoma accounts for only 1% of all skin cancers but causes by far the most skin cancer-related deaths. It's also extremely "heritable"—i.e., transmissible from one generation to the next—at nearly double the rate of breast cancer. To better understand this so-called "silent killer," the **GROSS FAMILY MELANOMA REGISTRY** was launched at Cleveland Clinic with a \$1.2 million gift from philanthropists Harley and Rochelle Gross and the extended Gross family. Five years later, the registry has grown from 100 patients to more than 500 patients. Led by Pauline Funchain, MD, and Joshua Arbesman, MD, it's the only registry of its kind in the United States. By studying families with high rates of melanoma, researchers are gaining new insights into its genetic underpinnings. In addition to pinpointing high-risk individuals who have not yet developed cancer, the registry has the potential to identify people with melanoma who might be at risk for developing other cancers. "You literally can save family members' lives, and that's how we hope referring physicians and study participants see this, because the reality is that we're not giving people a burden of knowledge," Dr. Funchain says. "We're giving them power to focus on prevention for themselves and their families."

Take it from Wei Chen, MD, FACS: SUPERMICROSURGERY demands rigorous coordination among the eye, microscope and hand. The procedure can treat everything from non-healing wounds in a person with advanced diabetes to lymphedema, which is swelling caused by excess lymphatic fluid, seen mostly in people who have undergone cancer interventions such as surgery, radiation or chemotherapy. Very few surgeons are trained to perform supermicrosurgery, but Dr. Chen believes a resident can learn the skills in three months. A corporate grant from Lympha Press will pay for a fellowship position to bolster Dr. Chen's research and train more supermicrosurgeons. "Those of us already practicing microsurgery and supermicrosurgery are very passionate about these techniques," says Dr. Chen, Head of Regional Microsurgery and Supermicrosurgery and Co-Director of the Center for Lymphedema Research and Reconstruction. "But they can be intimidating. I hope we alleviate some of the hesitation by showing that trainees can become full-fledged supermicrosurgeons in a relatively short time."



PRIORITIES + POSSIBILITIES

On the preceding pages, you've seen how philanthropy has made a profound impact on patient care, research and education across Cleveland Clinic. The work goes on. Keep reading to learn more about our key priorities for the future—and how your generosity can make a difference as we continue to venture past the limits of the possible.



IT'S TIME FOR A NEUROLOGICAL MOONSHOT— AND CLEVELAND CLINIC IS THE LAUNCHPAD.

Neurological diseases upend millions of lives. While the medical community has learned to manage some symptoms of some brain disorders, no one can predict who will get sick or cure these diseases (Alzheimer's, epilepsy, Parkinson's and more) once they take hold.

- Tapping the expertise of physicians and scientists from across our global health system, the CLEVELAND CLINIC BRAIN STUDY is reaching further than any other study to unlock the secrets of the body's command center. Data from tens of thousands of neurologically healthy people will be collected to identify brain disease biomarkers as well as targets for preventing and curing neurological disorders.
- A NEW HOME FOR CLEVELAND CLINIC'S NEUROLOGICAL INSTITUTE will be the first-ever fully integrated neurological hospital. This dynamic addition to our main campus will include leading-edge facilities for inpatient and outpatient care, in addition to imaging and surgical services, research laboratories to investigate the function of the brain, and innovation labs to develop the neurological treatments of tomorrow.

We're shooting for the moon—and philanthropy will provide the rocket fuel to get us there.

IN THE INNOVATION DISTRICT, WE'RE DOUBLING OUR RESEARCH CAPACITY TO BRING MORE BREAKTHROUGHS TO MORE PATIENTS.

Soon to rise on Cleveland Clinic's main campus are new buildings housing labs, additional research space and other facilities. Welcome to the Innovation District.

- The DISCOVERY ACCELERATOR, our partnership with IBM, will harness the power of artificial intelligence and quantum computing for big-data research.
- The GLOBAL CENTER FOR PATHOGEN & HUMAN HEALTH RESEARCH will combat emerging infectious diseases and future pandemics and investigate the complex intersections between the immune system and viral cancers.
- The CENTER FOR IMMUNOTHERAPY AND PRECISION IMMUNO-ONCOLOGY will develop immune-based therapies that offer new hope to patients with cancer and other diseases.
- The CENTER FOR THERAPEUTICS DISCOVERY will shorten the wait between research and clinical drug trials.
- An expanded GENOMIC MEDICINE INSTITUTE will raise the bar for personalized care.

Big ideas will require big investments in the Innovation District—and philanthropy will be essential to the success of this exciting initiative.



WE'LL HEAL, HIRE AND INVEST IN OUR COMMUNITIES.

We're committed to bringing health and opportunity to all. We're working to lower infant mortality rates and premature birth rates. We're also taking steps to improve the economic health of our communities with fresh approaches to workforce development.

- Our new CENTER FOR MATERNAL AND INFANT HEALTH is proactively addressing the health of mothers and babies in targeted communities by providing prenatal care, addressing medical complications during pregnancy and providing support for families after babies are born.
- To address gaps in healthcare professions, we're providing SCHOLARSHIPS AND TRAINING PROGRAMS that translate into jobs for community residents.
- We're establishing EDUCATIONAL PATHWAYS to healthcare careers for underrepresented youth.
- We're creating OPPORTUNITIES FOR OUR CAREGIVERS to grow with us as we make Cleveland Clinic the best place to work in healthcare.

Philanthropy will help us further strengthen the ties between Cleveland Clinic and the communities that we serve.

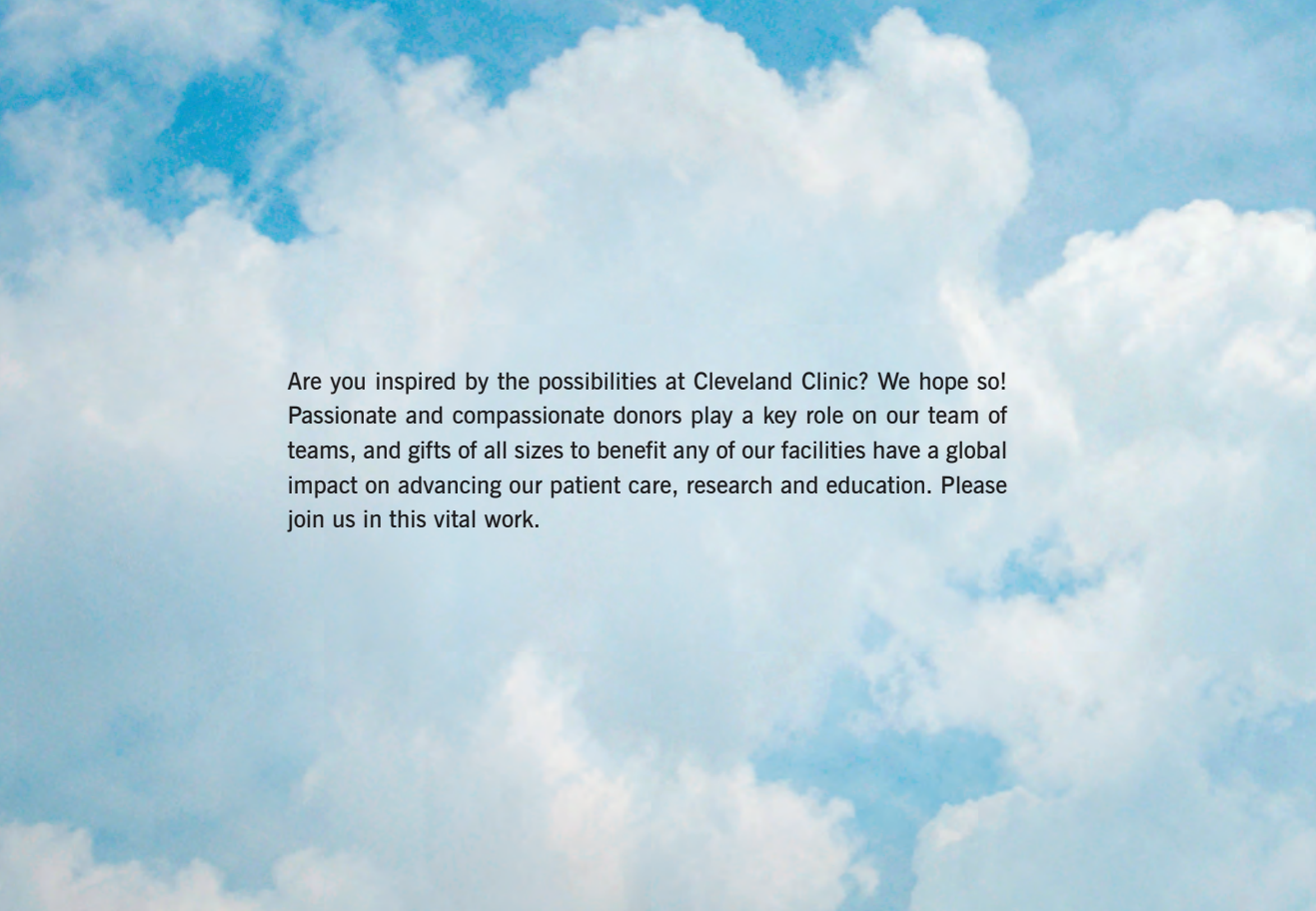


WE'RE GROWING TO SERVE MORE PATIENTS.

With our world-class care, we can save more lives and change more lives, near and far. This will mean expanding our distance health services as well as our physical footprints in communities.

- CLEVELAND CLINIC LONDON HOSPITAL, which opened in March 2022, is the most technologically advanced hospital in the United Kingdom. It puts our renowned care in cardiology, orthopaedics, digestive disease and neurology in easier reach for our patients in Europe and the Middle East.
- In Ohio, we have a NEW HOSPITAL under construction in Mentor and an EXPANDED CANCER CENTER at Cleveland Clinic Hillcrest Hospital.
- Plans are underway for SIGNIFICANT EXPANSIONS to support our ongoing growth in the Florida communities served by Cleveland Clinic.
- We're exploring NEW OPPORTUNITIES in northwest Arkansas.

As we pursue our mission of caring for life, researching for health and educating those who serve, philanthropy will make it possible to touch even more lives around the globe.



Are you inspired by the possibilities at Cleveland Clinic? We hope so! Passionate and compassionate donors play a key role on our team of teams, and gifts of all sizes to benefit any of our facilities have a global impact on advancing our patient care, research and education. Please join us in this vital work.

Learn more at ClevelandClinic.org/Giving

