



## YOU HELP SAVE

#### **Letter From the President**

Michael T. Lawton, MD, President and CEO of Barrow Neurological Institute has set a very high bar for the Institute, a vision he calls Barrow 3.0. In a very short time, he has led the organization to be well on its way to being recognized as the world's leading neuroscience institute. But being the world's leading neuroscience institute is simply the means to the end towards providing innovative and revolutionary ways to fight the most devastating conditions of our time, which ultimately leads to saving lives.

Saving lives doesn't happen on its own. Dr. Lawton genuinely recognizes that it is our donors' passion, care, and generosity that builds the ladder to a healthy recovery for so many who come to Barrow. And Dr. Lawton, along with all of the physicians, researchers, and staff at Barrow Neurological Institute, as well as all of us here at Barrow Neurological Foundation, understand one important fact: You help save what matters most. Our patients. The ladder that you are helping to build has allowed us to climb to and reach many significant milestones this past year.

<u>Your support</u> helped those who help all of us by funding the transition to a new telemedicine platform that allowed us to treat patients during the pandemic, and by providing our nurses with the necessary materials, meals, and hygiene supplies to fight on the front lines to help our community.

<u>Your benevolence</u> helped us make advances in technology and innovation by enabling the creation of N95 replacement masks during the pandemic and the development of cutting-edge virtual training programs to educate the next generation of the world's leading neurosurgeons, neurologists, and neuroscientists. You also helped us treat the first patient in the world in the first in-human clinical trial of sonodynamic therapy.

<u>Your dedication</u> helped propel Barrow into the future of neuroscience and neurosurgery with the planned expansion of the Ivy Brain Tumor Center and the completion of the new Barrow Neuroplex, a five-story, 130,000-square-foot nerve center for innovative research and treatment at Barrow.

<u>Your kindness</u> empowered Barrow to treat patients like Eli Martinez, who suffered from a significant angioma that paralyzed him, and through the dedication of our Neuro-Rehabilitation Center, was able to walk again with the exoskeleton.

<u>Your generosity</u> lifted Barrow Neurological Foundation to a record-setting fundraising year with an unprecedented \$54 million raised and over \$28 million distributed in grants.

These milestones, and more, are highlighted in the following pages of this year's Impact Report. As you read each important aspect of this report, please remember that it is your generosity and your care that has helped us build this ladder to health and recovery for so many Barrow patients. Remember, you help save what matters most.



With tremendous gratitude,

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Katie A. Cobb, President Barrow Neurological Foundation

**66** Our donors' passion, care, and generosity build the ladder to a healthy recovery for so many treated here at Barrow.

Michael T. Lawton, MD
 President and CEO
 Barrow Neurological Institute

Barrow Neurological Foundation

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**Barrow Neurological Foundation** 

## BARROW BY THE NUMBERS





states reached through Alzheimer's & memory disorders outreach programs



Dr. Lawton has performed MORE THAN 5,000 aneurysm surgeries 28 Barrow neurosurgery residents, with 4 neurosurgery fellows



**5,700** brain and spine surgeries at Barrow annually 581 patients treated by

Barrow mobile stroke unit since 2017



**30,000** 

outpatient Neuro-Rehabilitation visits annually

**77,600+** patients seen at Barrow annually

1,250 deep brain stimulation procedures by Dr. Francisco Ponce



28 Barrow neurology residents, with 9 neurology fellows

**320+** active research studies





# **())**

Arizona student-athletes have completed the Barrow Brainbook



**1st** in-human trial of sonodynamic therapy in the world



11 cutting-edge neurosurgery-dedicated operating rooms



ongoing Parkinson's research studies



DONOR IMPACT

FY2021



2,900 Total donors

\$28,000,000 TOTAL DISTRIBUTED TO BARROW

NEUROLOGICAL INSTITUTE

\$21,000,000 Designated to centers/programs

\$5,000,000 basic, clinical, and translational research

> \$1,700,000 ENDOWED RESEARCH CHAIRS

### You Fund the Future of Neuroscience.

Barrow Neurological Foundation is committed to its mission of supporting innovative treatment, groundbreaking research, and advanced medical education at Barrow Neurological Institute. Thanks to gifts from generous donors, the Foundation ended the year with a record high in fundraising, despite the challenges presented by COVID-19.

#### **BARROW NEUROLOGICAL FOUNDATION**

Through support from our donors, the Foundation raised an unprecedented **\$54 million** in fiscal year 2021, (July–June) including a transformational gift from the Ben & Catherine Ivy Foundation that will go toward the expansion of the Ivy Brain Tumor Center at Barrow. The Foundation distributed over **\$28 million** to Barrow Neurological Institute, with over **\$21 million** designated by donors for specific purposes, including the Lonnie and Muhammad Ali Legacy Care Program, Jan & Tom Lewis Migraine Treatment Program, Petznick Stroke Center, and Thurston Innovation Center. Another **\$5 million** in funding was directed to support research at the Institute, including startup funds for new researchers and **24 potentially life-saving and life-changing projects**, which were selected through a competitive review process. In addition, **\$1.7 million** from endowments was distributed.

#### WOMEN'S BOARD

The Women's Board of Barrow Neurological Foundation raised a record **\$8.7 million** for the Institute through the 2021 Barrow Grand Ball, "A Grand Toast to Barrow." Championed by 2020–21 Chairman Sandy Hecomovich, Women's Board members Diane Might and Kolby Moffatt co-chaired the event and galvanized members and donors during one of the most challenging times in recent history.



The Grand Ball committee selected the Petznick Stroke Center, led by Michael Waters, MD, PhD, as its special project. Funds raised through the 2021 Barrow Grand Ball allowed the Petznick Stroke Center to order a second mobile stroke treatment unit, which provides life-saving emergency room care curbside to stroke victims within its response radius. In addition to the Petznick Stroke Center, funds from the Grand Ball supported research in other critical areas at Barrow, including Alzheimer's and Parkinson's disease, aneurysm and AVM, neuro-rehabilitation, concussion and traumatic brain injury, epilepsy, migraine, brain tumors, spine disorders, and more.

#### **EMPLOYEE GIVING PROGRAM**

Every day, Barrow employees give their all at work, and yet they always find a way to give back. Last year, the Foundation's Employee Giving Program, Barrow BLUE CREW, raised over **\$145,000** to support the groundbreaking research programs at the Institute. 6 ...this support reflects the community's commitment to Barrow and the understanding that our work benefits this community and extends out to the entire world.

 Michael T. Lawton, MD, President and CEO of Barrow Neurological Institute

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## <sup>66</sup>Being at Barrow made me feel h

#### You Helped a College Student Walk Again. Even more troubling, Eli caught pneumor wasn't able to receive a vital surgery. Eli's Samuel, recalls the nearly impossible odd

Imagine waking up on Monday and going about your everyday life. Then, by Friday, you're in pain and unable to move, without any plausible explanation. This is exactly the situation that twenty-three-year-old Elijah (Eli) Martinez found himself in.

In November 2020, Eli was attending classes online at Grand Canyon University in Phoenix, Arizona and working at a local grocery store. Just a few weeks before Thanksgiving, Eli came back from work and noticed that his neck was hurting. The next day, his right arm started tingling and became numb, but Eli just chalked it up to an old injury he probably irritated. However, when Eli tried to get out of bed and his legs gave out, he knew something was very wrong.

#### A QUICK DECLINE

Eli was admitted to the hospital, where his symptoms worsened severely. In less than a week, his health had completely deteriorated. He was in extreme pain and couldn't move his body. Finally, Eli received a diagnosis: cerebral cavernous angioma, a cluster of dilated blood vessels with an enlarged, irregular structure that can leak and cause a host of neurological issues. In Eli's case, this was caused by an inherited genetic mutation, a rarity seen in only about 15 percent of occurrences. Even more troubling, Eli caught pneumonia and wasn't able to receive a vital surgery. Eli's father, Samuel, recalls the nearly impossible odds his son was up against, saying, "He couldn't get the surgery, he couldn't move his legs or arms, and he had a breathing tube in, so he couldn't even talk."

Eventually, the pneumonia cleared up and Eli was able to undergo surgery. However, the damage was already done. Eli was paralyzed from the neck down, and his life would never be the same.

#### THE BARROW DIFFERENCE

The first weeks in the hospital's neuro-restorative unit were extremely difficult for Eli as he struggled to adjust to a whole new way of life. Then, a physician recommended the Neuro-Rehabilitation Center at Barrow Neurological Institute. That's when Eli found hope again.

When he got to Barrow, Eli began to improve greatly, both physically and mentally. "Being at Barrow made me feel happier than I had in a long time,"

## appier than I had in a long time.

- Eli Martinez, Student-Grand Canyon University

he says. The change in Eli's disposition had a lot to do with his incredible rehabilitation team, who challenged him to give his recovery his all and pushed him to accomplish tasks he never dreamed of doing again. "They wanted to make sure that I got the most out of everything that I was doing, no matter what it was. They made sure that I was improving every single day," he explains.

With the cutting-edge innovation and technology at Barrow, Eli was able to do something he thought was impossible — walk.

"With the help of my physical therapist, I was able to get into the exoskeleton, which was really incredible to walk in," says Eli.

Those were the first steps Eli had taken in many long, painful months. By the time he left Barrow

Eli was able to brush his teeth, take a shower, get ready, and do a wheelchair transfer by himself, all huge accomplishments.

"Eli is so positive. He may get frustrated, but he has never given up and that amazes me," says Samuel. "He's such a good guy, and for him to go through this has been extremely hard. I just want to see him be independent again." That is why the whole family is moving to Phoenix, so Eli can receive the best care possible at Barrow.

## You Help Those Who Help Others.

COVID-19 had a profound impact on medical facilities across the globe. Hospitals were filled to capacity, clinic visits were converted to telemedicine appointments, and protective equipment was scarce. However, our dedicated community of donors rallied to ensure that patients continued to receive world-class treatment and care at Barrow.

#### **TELEMEDICINE APPOINTMENTS**

To continue caring for patients during the pandemic, all programs at Barrow had to transition to a telemedicine platform. Telemedicine communications differed for every program to best suit the individual needs of each patient. As part of its Domestic Violence Traumatic Brain Injury Program, the Barrow Concussion and Brain Injury Center provided participating shelters across Arizona with Wi-Fi-enabled iPads to conduct patient visits. Meanwhile, the Barrow Neuro-Rehabilitation Center utilized a video messaging system called Medical Memory, which records doctor visits, provides nursing reports and patient schedules, and then sends the information to families.

#### **NEUROSCIENCE NURSES**

When the pandemic hit, Barrow Neuro-ICU nurses stepped up to the front lines to care for critically ill patients with COVID-19. Even with all the precautions taken, every single shift still brought anxiety as Barrow neuroscience nurses put their own health at risk to care for patients whose families could not be with them. Through philanthropy, Barrow was able to provide neuroscience nurses with essential items to sustain their physical and emotional wellness.

The Foundation's Annual Giving Program raised over \$38,000 for the Nurses Fund to ensure that nurses received easily accessible, nutritious meals and necessary hygiene supplies. The Foundation's Board of Trustees also contributed over \$128,000 to the Nurses Fund. Thanks to the support of the Barrow Women's Board and gifts from generous donors, \$150,000 was contributed to create two Resilience Rooms where Barrow neuroscience nurses could go for reprieve. In the first seven months after opening, the Resilience Rooms have had approximately 3,000 uses, which is about 15 uses per day.



6 6 Nurses care for people at their darkest, scariest, and loneliest moments. It is our privilege.

 Virginia Prendergast, PhD Senior Director of Advanced Practice Nursing



decrease in emotional distress after using Resilience Rooms



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## You Fuel Innovation.

To continue pushing the boundaries of patient care, physicians and scientists at Barrow are constantly making advancements in technology and innovation. Your support allows Barrow to be at the forefront of cutting-edge medical technology and new treatments that save lives.

#### SONODYNAMIC THERAPY

On March 17, 2021, the Ivy Brain Tumor Center at Barrow launched the first in-human clinical trial of sonodynamic therapy in the world. Sonodynamic therapy combines the use of a focused ultrasound device and a proprietary formulation of 5-aminolevulinic acid. Ultimately,

the groundbreaking study aims to develop a non-invasive treatment option for patients with recurrent glioblastoma and other high-grade gliomas. Initial results of the study were positive, indicating sonodynamic therapy rapidly leads to targeted oxidative stress and cell death in human glioblastoma tissue. It was also welltolerated in all patients.

#### **N95 REPLACEMENT MASKS**

As the COVID-19 pandemic escalated, hospitals started running out of personal protective equipment (PPE) for doctors and nurses. That's when the Thurston Innovation Center at Barrow — a central hub for neurosurgical innovation and collaboration—stepped in. Residents and physicians engineered a way to develop two different versions of a N95 substitute mask. The first version utilized a 3D printed base and had a custom skin-safe silicone seal that allowed it to be form-fitted to an individual's face. The second version was a more advanced iteration of the first. Rather than hand casting each mask, the Thurston Innovation Center team engineered injection-molded masks that were lighter in weight, easier to wear for extended periods of time, and easier to clean. Each version used P100 filters, and each mask was fit-tested with the same Occupational Safety and Health Administration (OSHA) approved fit tests done for every FDA-approved respirator.







3,000+ advanced masks made with injection-molded process



108 countries viewed Barrow Base Camp

#### **BARROW NEUROSURGERY BASE CAMP**

When COVID-19 forced most in-person education to come to a halt, Barrow continued to provide world-class training opportunities through the teaching video series, Barrow Neurosurgery Base Camp. The donor-funded upgrades to the Eller Telepresence Room made Barrow Neurosurgery Base Camp an indispensable training tool by allowing the incorporation of live video captured during the surgery, along with 2D and 3D images. Currently, there are 12 episodes available worldwide via YouTube. The series has been viewed in 108 countries, which is over 50 percent of the countries in the world.

#### **VETERAN'S RESEARCH**

Modern body armor saves lives. However, it is believed to contribute to an increased incidence of nerve trauma among military service members. Richard Dortch, PhD, is working on neuroimaging research to help veterans and civilians with nerve trauma by developing and validating new MRIbased biomarkers for nerve repair. These advancements could enable physicians to monitor nerve regeneration as it happens and re-operate before it's too late to change the outcome, potentially leading to a reversal of paralysis and restoration of sensation for patients.

#### **IVY CENTER EXPANSION**

Since opening in 2018, the Ivy Brain Tumor Center at Barrow has been a beacon of hope for patients across the world battling glioblastoma and other dangerous brain tumors. The Ivy Center is now expanding and has announced plans to build a 75,000-square-foot global headquarters that will serve as the largest translational research center dedicated to brain tumor drug development in the world. The expansion marks so much more than a new building. As Nader Sanai, MD, director of the Ivy Brain Tumor Center, says, "It reaffirms our commitment to the brain tumor community that we will leave no stone unturned in the pursuit of new treatment options."

The continued growth and success of the Ivy Center's novel clinical trials program is made possible through the unwavering leadership of the Ben & Catherine Ivy Foundation, and support from Barrow Neurological Foundation, Barrow Neurological Institute, and Dignity Health. Construction of the new headquarters is expected to be completed in 2023. It is home to some of the most talented and lauded neurosurgeons, neurologists, and neuro-scientists in the world. Once fully occupied, the Barrow Neuroplex will contain the entire Department of Neurosurgery, plus an ambulatory surgical center and a pre-admission center for neurosurgery.

The Barrow Neuroplex will also contain ENT and Skull Base Surgery, as well as four outpatient neurology clinics – stroke, neuro-oncology, neuroendocrinology, and the neuro-infusion center.

The addition of the Barrow Neuroplex frees up 30,000 square feet in existing space, which will be transformed into cutting-edge laboratory space and an international medical education hub, bringing our scientists closer to the clinic, assisting in the facilitation of translational research, and inspiring the discovery of the next breakthrough treatments for devastating neurological conditions.

Thanks to your support, Barrow physicians, researchers, and scientists have an infrastructure to support and lead innovative treatments, groundbreaking research, and the training of the next generation of the world's leading neurosurgeons, neurologists, and neuroscientists.

#### **BARROW NEUROPLEX**

What started as a vision for the future by Barrow Neurological Institute President and CEO Michael T. Lawton, MD, is now a reality, thanks to your support.

The Barrow Neuroplex, a five-story, 130,000-square -foot facility and the global headquarters of Barrow is now open.



#### BARROW NEUROLOGICAL INSTITUTE CENTERS OF EXCELLENCE

- ALS Association Certified Treatment Center of Excellence
- Lewy Body Dementia Association Center of Excellence
- Angioma Alliance Center of Excellence
- American Cleft Palate Association
   Approved Team for Cleft & Craniofacial
- National Association of Epilepsy Centers, Level 4 Comprehensive Epilepsy Center
- Parkinson Foundation Center of Excellence
- National Multiple Sclerosis Society Center for Comprehensive Care
- Muscular Dystrophy Association
   Care Center
- Ekso Bionics Center of Excellence (Neuro-Rehabilitation)
- The Joint Commission, Comprehensive Stroke Center
- Huntington's Disease Society of America
   (HDSA) Center of Excellence
- HHT Center of Excellence (Cerebrovascular)

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