

One team
One goal

#endcancer

THE UNIVERSITY OF TEXAS

MD Anderson
~~Cancer~~ Center

Making Cancer History®

CONTENTS

ANNUAL REPORT FY2019

MISSION

The mission of The University of Texas MD Anderson Cancer Center is to eliminate cancer in Texas, the nation and the world through outstanding programs that integrate patient care, research and prevention, and through education for undergraduate and graduate students, trainees, professionals, employees and the public.

VISION

We shall be the premier cancer center in the world, based on the excellence of our people, our research-driven patient care and our science.

We are Making Cancer History®.

CORE VALUES

Caring: By our words and actions, we create a caring environment for everyone.

Integrity: We work together to merit the trust of our colleagues and those we serve.

Discovery: We embrace creativity and seek new knowledge.



A Comprehensive Cancer Center Designated by the National Cancer Institute

Visit the Annual Report online:
www.mdanderson.org/annualreport

LETTER FROM THE PRESIDENT

MD Anderson President Peter WT Pisters, M.D., discusses how, through multidisciplinary care, the institution is Making Cancer History®.

3



PERFECT MATCH

Lymphoma patient JC Cox needed a stem cell transplant. His brother Gary was a perfect match.

4



HAPPILY EVER AFTER

Lauren O'Malley and Jake Woodward graduated from law school, survived cancer and got married.

10

FAST TRACK

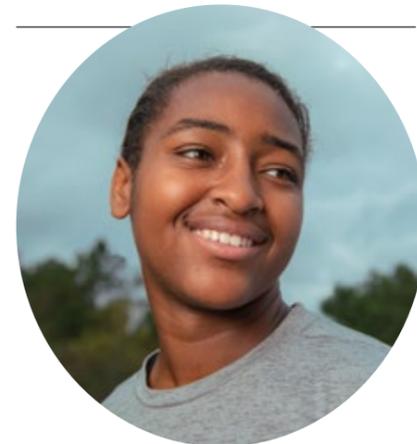
The FAST Clinic gets patients diagnosed with an aggressive type of thyroid cancer into treatment quickly.

18

KEEPING CAREFUL WATCH

MD Anderson's one-of-a-kind Hemovigilance Unit monitors patients for reactions to blood transfusions.

22



BRAIN TUMOR IN THE BLADDER

Jazzy Richards is the only known person in the world to be diagnosed with a brain tumor in the bladder.

24

BACK ON THEIR FEET

Computer models are helping doctors predict what type of surgery will help patients with bone cancer recover in the shortest amount of time.

32



GIVING PATIENTS A VOICE

Toni Vasquez Jordan, center, navigated cancer treatment with support from her daughters, Lindsey, left, and Gabriella, right. Now she's a voice for others.

38

TECHNO-STRESS RELIEF

MD Anderson's patient education library helps older patients overcome their fear of technology by offering personalized help with devices.

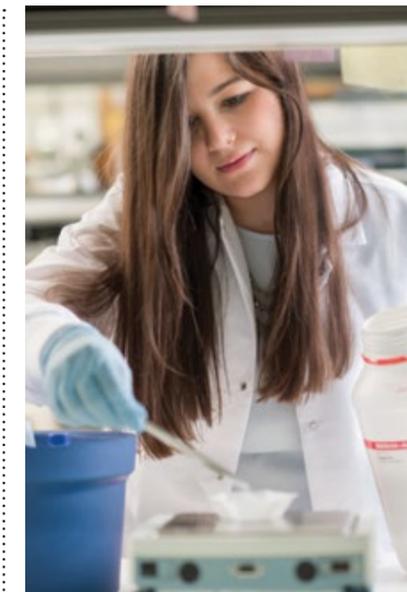
46



GOING THE DISTANCE

Smokers who want to kick the habit can participate in one-on-one MD Anderson counseling online, no matter how far away they are.

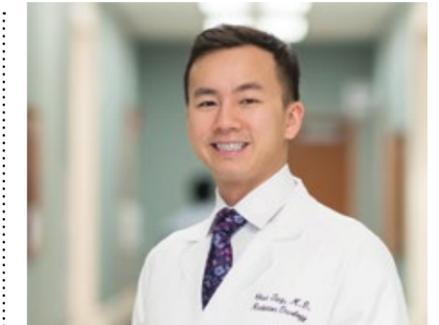
50



NARROWING THE GAP

Carolina Garcia Garcia is enrolled in a unique program designed to eliminate cancer care disparities in Puerto Rico and Texas.

52



UNDER ONE ROOF

Prostate cancer patients receive better care when their specialists work together in the same clinic.

55



BREAST CENTER CELEBRATION

The Nellie B. Connally Breast Center celebrated its 25th anniversary at a December gala.

56

JOIN OUR COMMUNITY

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MDAndersonCancer

MDAndersonCancerCenter

#endcancer

Photo: Jim Olive



MD Anderson is ranked No. 1 for cancer care in U.S. News & World Report's "Best Hospitals" survey.

Photo: Adolfo Chavez III



MD Anderson President Peter WT Pisters, M.D., signs the strikethrough cancer wall at one of many community events held throughout the year.

Message from the president

As I reflect on the many accomplishments of our talented faculty and staff in Fiscal Year 2019 and on the remarkable wins stemming from MD Anderson that I have been privileged to witness, I am filled with immense pride. From advancing our mission, to again ranking as the No. 1 cancer center in the nation, to improving patient outcomes and increasing the speed of discovery, each win, big and small, has brought us one step closer to our ultimate goal: to end cancer.

Our institutional success can largely be attributed to the incredible strength of our teams, made up of 22,000 cancer fighters. The unprecedented level of engagement and unity we saw from our teams this year exceeded all expectations. No matter the opportunity or challenge, we banded together with purpose, and now we are stronger, safer and better.

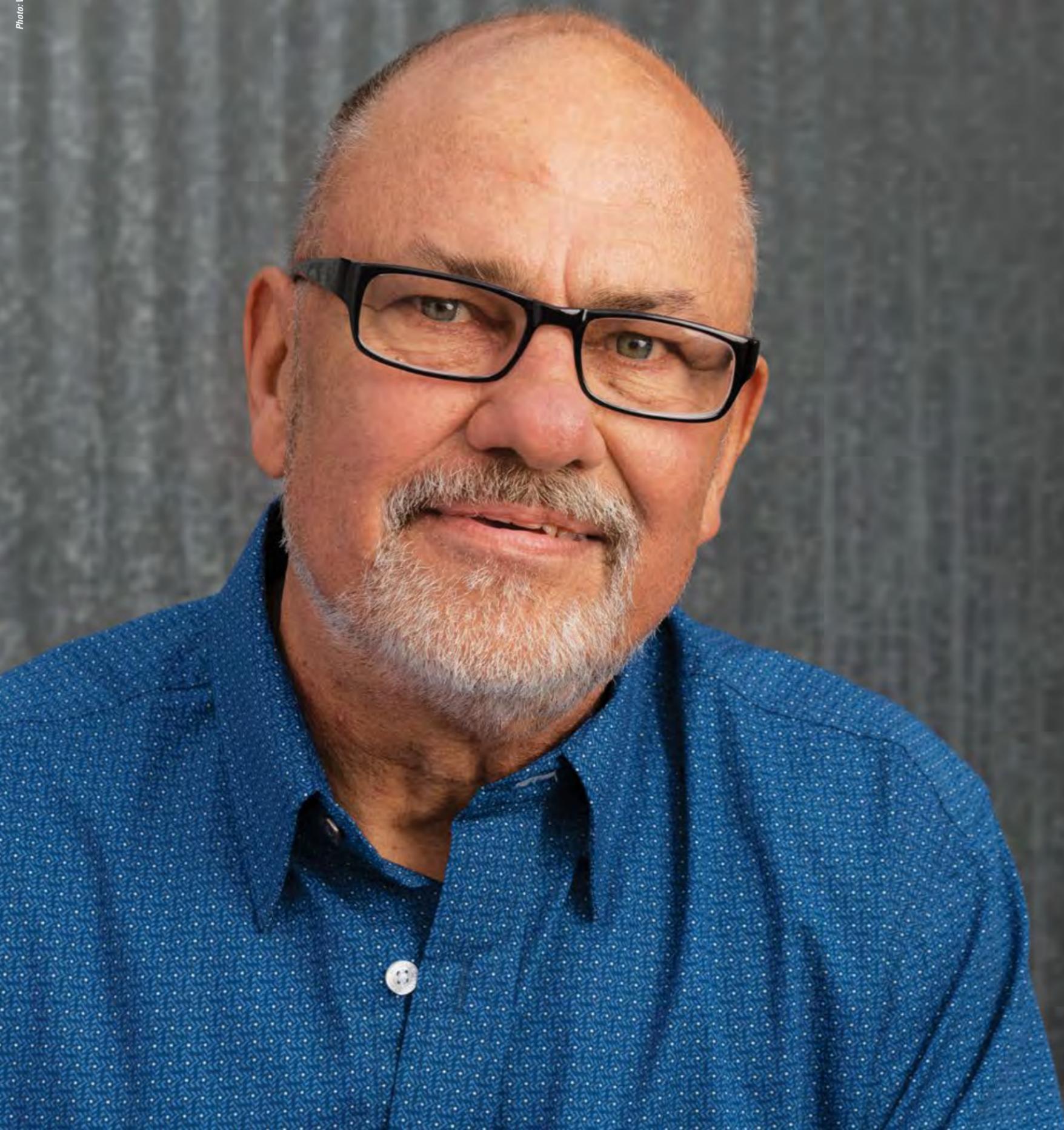
Teamwork has been a hallmark of MD Anderson for decades. Perhaps one of the greatest demonstrations of our passion for teamwork is our model of providing multidisciplinary cancer care, pioneered at the Nellie B. Connally Breast Center 25 years ago. Physicians, nurses, nutritionists, social work counselors, pharmacists and more work in careful

coordination to provide highly specialized treatment plans for all types and stages of breast cancer. Our teams rally around a patient's treatment plan to integrate care in a manner that is safe, efficient and comfortable. The model, which has now been implemented throughout the institution, is just one of many ways we are utilizing a multidisciplinary model to advance our best ideas and efforts.

Within this year's report, you will learn more about those efforts through stories that illuminate the courage of our patients, the thoughtfulness of our supporters and the strength exemplified by our employees in our quest to gather across disciplines to serve our mission. United, we are forging a path to a new level of excellence, knowing that every team member plays a role and that every moment counts.

Over the next year, I am excited to embark on the path ahead with our patients and caregivers, our friends and supporters, and our 22,000 cancer fighters, who share our goal of teaming together, building on our excellence and gifting more time. We are resilient, unified, ready. And together, we are Making Cancer History.®

Peter WT Pisters, M.D.
President



The bounceback from
my treatment was amazing.

JC Cox
Survivor

JC Cox is only the eighth person in the world to be treated with natural killer cells that are specially engineered in the lab to find and kill cancer cells. Just 30 days after the treatment, all signs of Cox's lymphoma had disappeared. Today, a year later, he remains cancer-free.



JC Cox, left, received a stem cell donation from his brother Gary, who proved to be a perfect match.



Katy Rezvani, M.D., Ph.D., led the CAR NK clinical trial that put JC Cox's cancer into complete remission, meaning all signs of cancer disappeared.

SEEK AND DESTROY

Natural killer cells live up to their ominous name

By Clayton Boldt, Ph.D.

JC Cox knows the meaning of perseverance. After undergoing a dozen different cancer treatments, he embodies it.

The first sign of trouble occurred in 2006. Cox, who had always worked long hours as an air conditioning and heating technician, began to lose steam.

"I'd come home after work and fall into bed immediately without eating dinner," he recalls. "The next thing I knew, it was morning, and I was still exhausted."

But the hardworking Cox soldiered on, until one day, he could barely breathe.

"I tried to inhale but couldn't," he says. "That's when I sounded the alarm and headed for the emergency room."

In the hospital, doctors discovered that lymph fluid had built up in Cox's chest cavity and spilled into one of his lungs, causing it to collapse. They drained 5 gallons of the excess

fluid from his body, then sent it to the lab for analysis, along with tissue from a swollen lymph node.

Cox was stunned when the results came back. His diagnosis? Follicular lymphoma, a slow-growing type of cancer that affects B cells – the white blood cells that circulate in the lymphatic system and battle infections.

"I thought I'd caught a virus," says Cox, now 66. "Cancer never crossed my mind."

After absorbing the news, Cox and his wife, Kathy, vowed to fight.

"No way were we going to back down," Kathy says. "We were prepared to do whatever it took."

Initial therapies

Cox's treatment began with six cycles of chemotherapy at a Dallas hospital near his home. The treatment put him in remission for 13 months, but the cancer came back. He

then endured three more rounds of high-dose chemo. That wiped out not only his cancer cells, but also many of his healthy blood cells, making him vulnerable to infection.

"We were warned this would happen," Kathy says. "The healthy cells become collateral damage in the battle against cancer – it's just part of the process."

To replenish the healthy cells that chemo had destroyed, Cox underwent a stem cell transplant. Immature cells that would later develop into healthy blood cells were collected from his bone marrow and infused back into his bloodstream. The treatment worked for four months, but, again, the cancer returned.

Seeking options

Out of options, Cox's Dallas doctor referred him to MD Anderson. There, he might be eligible for an experimental trial of a new lymphoma drug called ipilimumab, trade name

Yervoy. The drug trains the immune system to find and attack cancer cells. But in some patients, the drug also attacks healthy cells, causing serious side effects. That's exactly what happened to Cox.

He ran a high fever, fell into a coma and ended up on life support.

"Finally he recovered, and we were so relieved," recalls Kathy. "But my husband was in desperate need of better options."

At that point, Sattva Neelapu, M.D., professor of Lymphoma and Myeloma at MD Anderson, prescribed a drug named Rituximab. It didn't eliminate Cox's cancer, but it did prevent it from spreading – for a while. In 2017, Cox's follicular lymphoma transformed into diffuse large B-cell lymphoma, a more aggressive form of the disease. He endured several aggressive chemotherapy treatments, but they only kept his cancer at bay a few weeks at a time.

"I had tumors on my face and my temples that came back every two weeks after chemo," Cox recalls. "It was a race, and the cancer was winning. We had to do something quickly."

Bad timing

By then, Cox was on the waiting list for a clinical trial of a groundbreaking new cancer treatment called chimeric antigen receptor (CAR) T cell therapy. With this technology, disease-fighting T cells are extracted from the patient's blood and taken to the lab, where scientists infuse them with a special receptor named CAR that binds to certain proteins on cancer cells. Large numbers of these CAR T cells are multiplied in the lab, then infused back into the patient's body to seek out, stick to and kill cancer cells. CAR T cell therapy achieved approval from the Food and Drug Administration (FDA) while Cox was still on the waiting list. This meant the trial no longer needed to accept new patients.

"That was bad timing," he recalls, "and very disappointing to hear."

Another option

Just when it looked like Cox's options were again dwindling, a new clinical trial testing CAR NK cell therapy was launching at MD Anderson.

Similar to the recently approved CAR T cell therapy, the new trial would add CAR to natural killer cells, also called NK cells. These disease-fighting cells live up to their ominous name by lurking in the body and being the first to respond to damaged or stressed tissues. They are capable of recognizing and killing cancer cells.



Photos: Wyatt McSpadden

With his health restored, JC Cox enjoys spending time with granddaughter Annie and great-grandson Grayson.

"NK cells are very good at recognizing cancer cells early on and destroying them, but cancers can develop ways of hiding from the immune system," says Katy Rezvani, M.D., Ph.D., a professor of Stem Cell Transplantation and Cellular Therapy. "By engineering NK cells to include CAR, we're able to expand upon their innate cancer-killing abilities."

CAR NK versus CART therapy

CAR NK cells offer a few advantages over CAR T cells. For instance, CAR T cells have to be generated from the patient's own T cells and can only be used to treat that patient. This is because T cells from a donor may inadvertently attack healthy cells while seeking out cancer cells – a phenomenon known as graft versus host disease. As a result, in CAR T cell therapy, T cells must be isolated from an individual patient before being engineered with CAR and given back to the patient, a process that can often take weeks and doesn't always work.

CAR NK cells, because of their unique biology, don't cause graft versus host disease and therefore do not need to be patient-specific. This allows for multiple doses of CAR NK cells to be manufactured from one donor; these can then be used to treat multiple patients.

Because of these unique properties, CAR NK cells have the potential to be manufactured in advance, frozen and stored, and made immediately available for any patient in need.

Cancer-free, finally

Cox enrolled in the trial and became only the eighth person in the world to be treated with CAR NK cells.

Just 30 days later, while analyzing his

“
We hope that these will
be an effective new
treatment option for
many patients in need.

Katy Rezvani, M.D., Ph.D.
Physician & Researcher

follow-up scans, Rezvani told Cox that things looked "pristine." That was April 2018, and he's been cancer-free ever since.

The results of the trial that Cox participated in were published in the New England Journal of Medicine in February 2020. Rezvani and her team treated 11 patients in the trial with CAR NK cells.

Seven, including Cox, achieved complete remission, meaning all signs and symptoms of cancer had disappeared. One had a partial remission, meaning evidence of cancer decreased, but did not completely disappear.

"While this is a small study and our follow-up is relatively short, we are extremely pleased with the promising results," says Rezvani. "We will continue to investigate CAR NK cells in broader clinical trials, and we hope that this will be an effective new treatment option for many patients in need."

In addition to the therapy's effectiveness, it caused no significant side effects – another advantage of CAR NK cells.



JC Cox's extended family, including six sisters and two brothers, traveled from across the country to celebrate his new life without cancer.

 **See how CAR NK works:**
mdanderson.org/carNK19

"The bounceback from my treatment was amazing," says Cox. "It was like I didn't even get sick. I was embarrassed to walk the halls at MD Anderson because I felt so good."

With all signs of cancer gone, Cox underwent a second stem cell transplant in August 2018, to get his beleaguered body in fighting shape, on the off-chance the cancer came back. His brother Gary was a perfect match, so he traveled to Texas from his home in Maryland to donate stem cells.

"We've always been tightknit," Cox says, "but this takes closeness to a whole new level."

After the transplant, Cox visited Rezvani

every month for checkups. As time went by, the intervals between his visits became longer – first three months, then six. Today, he sees Rezvani once a year.

The future of CAR NK cells

In November 2019, MD Anderson announced a new license and research agreement with Takeda Pharmaceutical Company to develop and advance CAR NK cell therapies.

This strategic partnership is critical to bringing CAR NK cells to more patients through multi-institutional trials, which will determine whether CAR NK cells will become an FDA-approved treatment.

Today, Rezvani and her team are working to expand CAR NK cell therapy to 10 additional types of cancer.

She hopes to bring the next generation

of CAR NK cells into the clinic as quickly as possible.

Cox is hopeful as well, after seeing the benefits firsthand.

"Of all my cancer treatments, CAR NK cell therapy was by far the easiest," he says. "We're almost afraid to let our guard down, but I trust in Dr. Rezvani."

Rezvani and her team led the development of CAR NK cells at MD Anderson, with the support of the adoptive cell therapy platform, the Chronic Lymphocytic Leukemia Moon Shot® and the B-Cell Lymphoma Moon Shot®, all part of the institution's Moon Shots Program®, a collaborative effort to rapidly develop scientific discoveries into meaningful clinical advances that save patients' lives. ♦



Lauren O'Malley and Jake Woodward married last October after both were diagnosed with cancer.

Planning their future

Newlyweds take steps to preserve parenthood before treatment

By Katrina Burton

When Lauren O'Malley and Jake Woodward met in law school six years ago, they knew they were destined to be together. What they didn't know was that their journey would take them through individual cancer diagnoses, an aggressive autoimmune disease and a race to preserve their future.

Lauren was the first to be diagnosed. While she and Jake were still in law school at Georgetown University in Washington, D.C., she was rushed to the emergency room in early 2016 with severe abdominal pain. The couple received devastating news.

"They told me I had a large mass on my ovary that had likely spread to other organs," Lauren recalls. "Essentially, they said I had advanced ovarian cancer."

A Houston native, Lauren was familiar with MD Anderson, where she and her family sought a second opinion.

"I've had family members treated at MD Anderson, so I know it's the best cancer center in the country," says Lauren. "If I was going to be fighting for my life and future, it was going to be at MD Anderson."

After she took an emergency flight from Washington, D.C., to Houston, MD Anderson doctors determined Lauren had a serous borderline tumor – a less aggressive mass that had not spread beyond the ovary. Kathleen Schmeler, M.D., professor of Gynecologic Oncology and Reproductive Medicine, performed surgery to remove Lauren's left ovary and fallopian tube, leaving her cancer-free.

Preparing for a future family

Knowing this type of tumor increases the risk of developing a tumor on the other ovary, Schmeler referred Lauren to advanced nurse practitioner Deborah Holman, who counseled

Lauren and her family. After that, Lauren and Jake met with fertility specialist Terri Woodard, M.D., an associate professor of Gynecologic Oncology and Reproductive Medicine. Woodard discussed fertility preservation options with the couple.

"Jake was very supportive during this process," Lauren says. "He participated in the conversations as an advocate for me and my future."

Lauren decided to move forward with oocyte cryopreservation, a process where a woman's eggs are extracted, frozen and stored for later use. The entire process took 12 days, with Lauren taking daily injections of gonadotropin, a hormone that stimulates the ovaries to recruit multiple follicles that contain eggs. She underwent frequent monitoring, including transvaginal ultrasounds and blood tests to check hormone levels. Once tests confirmed that multiple large follicles were present, Woodard performed a procedure to retrieve the eggs and freeze them.

"Technological advancements over the years have improved fertility preservation success rates," says Woodard. "It also helped that Lauren was so young when she underwent the procedure."

An unexpected setback

With cancer behind them and renewed hope for a future family, Lauren and Jake graduated from law school in 2017, and moved to Houston. They both passed the Texas Bar Exam on the first try. That fall, Jake orchestrated an elaborate and romantic marriage proposal with help from Lauren's family.

The couple set a spring wedding date and jumped into wedding plans and their careers. But they soon faced another life-threatening medical setback.

In December 2018, four months before their wedding,



The couple exchanged vows under a majestic oak tree at a ranch owned by the bride's family in Round Top, Texas.



Photo: Wyatt McSpadden

After a honeymoon at Disney World, newlyweds Lauren and Jake are at home in Houston with their cat Samson.

Jake's speech began to slur, and he had difficulty chewing. Fearing her fiancé was having a stroke, Lauren rushed him to a local emergency room. Doctors there diagnosed Jake with myasthenia gravis, a rare autoimmune neuromuscular disease that causes extreme muscle weakness and swallowing problems. Scans also revealed a large tumor called a thymoma on his thymus gland. Thymomas are associated with autoimmune diseases, especially myasthenia gravis. Ten to 15% of patients with myasthenia gravis have a thymoma, and conversely, 30% to 45% of patients with a thymoma have myasthenia gravis.

"When I learned Jake had a tumor, my No. 1 priority was getting him to MD Anderson," Lauren says. "Within days, we were there."

Neuro-oncologist Sudhakar Tummala, M.D., immediately recognized the signs of a myasthenic crisis, a life-threatening medical emergency requiring respiratory support. Jake was admitted to the intensive care unit where he received breathing assistance and daily plasma treatments to strengthen his body and prepare it for surgery to remove the tumor.

Jake's MD Anderson care team cautioned that he might need chemotherapy after surgery, which could negatively impact his fertility. Lauren contacted Woodward for guidance.

"I was shocked when I received the call about Jake," recalls Woodward. "I'd kept in touch with the family over the years, and was saddened by the news of Jake's medical struggles."

Woodard helped Jake arrange to have his sperm frozen



Wedding photos: Josh & Dana Fernandez Photography

Fertility specialist Terri Woodward, M.D., right, helped the couple preserve their fertility before cancer treatment.

“ Fertility preservation gave us great peace of mind. It's nice to know that when we're ready, we can pursue parenthood.

Jake Woodward
Survivor

before treatment, with the hope that one day he and Lauren could have children through in vitro fertilization.

Cardiothoracic surgeon Reza Mehran, M.D., then surgically removed Jake's tumor, and he's now cancer-free.

"Fertility preservation gave us great peace of mind," Jake says. "It's nice to know that when we're ready, we can pursue parenthood."

With Jake still suffering from the debilitating effects of

myasthenia gravis after surgery, the couple postponed their wedding to give him time to grow stronger.

"We leaned on our faith and love for one another to get through the tough times," says Lauren. "After Jake's surgery, there was no question that his health was the priority."

A fairytale moment

On Oct. 19, 2019, the couple finally married under a majestic oak tree at a ranch owned by the bride's family in Round Top, Texas. Both Woodward and Holman attended the fairytale event.

"Having the opportunity to attend the wedding was very special," says Woodward. "Knowing that my work offers couples like Jake and Lauren hope gives me the sense that I'm living my purpose."

After a honeymoon at Disney World, Jake and Lauren are taking life one day at a time as Jake continues his autoimmune disease treatment. For now, the couple's two cats, Samson and Juniper, and their dog, Annabel, keep them busy.

"I got my wish," says Jake. "I was able to stand at my wedding and dance with my bride. Now, it's just a matter of me getting healthier and us growing old together. There's so much in store for our future." ♦

Breaking the blood-brain barrier

New clinic is changing the outlook for patients with cancer that has spread to the brain

By Scott Merville

Cancer cells that escape their original site and travel through the bloodstream to the brain find a supportive sanctuary there, where they grow and often cause significant neurological symptoms. These brain metastases, or secondary brain tumors, are notoriously difficult to treat because they're resistant to many therapies, and they live behind the blood-brain barrier – a semi-permeable membrane that keeps the brain “safe” from toxins in the blood. When cancer cells invade the brain, the blood-brain barrier transitions into the blood-tumor barrier, which still presents a roadblock for effective drug delivery to the brain.

“This makes brain metastasis one of the most difficult challenges in oncology,” says Frederick Lang, M.D., chair of Neurosurgery. MD Anderson has led the way in meeting this challenge with innovative clinical trials that are changing the prospects for these patients, who used to be routinely excluded from tests of new drugs.

Last year, medical oncologists, neurosurgeons and radiation oncologists teamed up to launch MD Anderson's Brain Metastasis Clinic. The goal is to sharpen their efforts and provide patients with more convenient and efficient care.

“Our Brain Metastasis Clinic enhances the patient experience, our clinical decision-making and our research efforts against these tumors,” says Lang, one of the clinic's three co-leaders.

Standard treatments

Any cancer can spread to the brain, but the types most likely to cause brain metastases include melanoma, lung and breast cancers. For most patients with multiple brain metastases, treatment typically involves surgery, radiation or both.

For decades, whole-brain radiation therapy has been the primary treatment for patients with multiple brain metastases. While the treatment didn't cure the cancer, it extended progression-free survival and reduced symptoms, such as paralysis and headache caused when tumors increase pressure inside the skull.

“But whole-brain radiation can also cause cognitive problems by diminishing a patient's short- and long-term memory, problem-solving skills, attention span and word recall,” says Jing Li, M.D., associate professor of Radiation Oncology and co-director of the clinic. “It's a quality-of-life issue.”

New approaches

Li and colleagues are conducting clinical trials to test new treatment approaches for multiple tumors.

One trial compares whole-brain radiation to a combination of immunotherapy drugs and stereotactic radiosurgery, a type of highly focused radiation.

The immunotherapy trains the immune system to fight cancer, and the stereotactic radiosurgery targets tumors while sparing nearby healthy brain tissue. This combination has



Gary Guthrie's English Mastiff, Uno, provided companionship during Guthrie's treatment for brain metastases.



Hussein Tawbi, M.D., Ph.D., says a main goal of the Brain Metastasis Clinic is to facilitate treatment faster.

shown promising early results in disease control.

Other clinical trials have shown that some drugs are capable of penetrating the brain's defenses to attack tumors.

And, says Li, "For some patients with one to three small brain metastases, improved surgical techniques or targeted radiation can result in a cure."

Streamlined care

In a single visit at the clinic, patients see a team of health care specialists to develop a treatment plan. By sparing them multiple appointments that can stretch over days, the clinic paves the way for treatment to begin sooner.

"One of the goals for our clinic is to facilitate treatment faster," says Hussein Tawbi, M.D., Ph.D., associate professor of Melanoma Medical Oncology and co-director of the clinic. "The important thing is how quickly we've adopted this approach and how happy patients and families have been with it."

Melanoma patient Gary Guthrie agrees. After having a single brain metastasis treated with radiation in California – in collaboration with MD Anderson oncologists – Guthrie visited the new clinic in October.

"My doctors were all in the same room at the same time during my appointment," says Guthrie, a retired law enforcement officer who had just moved to Texas with his wife, Leslie. "It gives me confidence to know that my physicians are communicating and all on the same page."

The tumor in Guthrie's brain is withering away, and he's now undergoing treatment for remaining metastases in other areas of his body.

In a single visit, patients see a team of specialists to develop a treatment plan.

Excluded from clinical trials

Brain metastases, or secondary brain tumors, occur in 10% to 30% of adults with cancer. Historically, Tawbi notes, patients with multiple brain metastases have survived only three to six months after diagnosis.

These patients have commonly been excluded from clinical trials of new drugs. This is because the blood-brain barrier blocks most drugs from entering the brain, protecting tumors as well as brain tissue.

The Food and Drug Administration (FDA) – the federal agency that approves new therapies – applies additional scrutiny to drugs that are capable of affecting the brain. The combination of a difficult target and additional regulation has steered drug companies toward developing anti-cancer drugs that avoid the brain.

"Twelve drugs have been approved for melanoma – 6,711 patients were treated in those trials, and not one with a brain metastasis got in because these drugs weren't designed to enter the brain," Tawbi says.

This began to change, initially by serendipity, during an international clinical trial of combination targeted therapies,



Photos: Wyatt McSpadden

One reason Gary Guthrie and his wife, Leslie, moved from California to Texas was to be closer to MD Anderson.

which are drugs tailored to the genetic characteristics of a patient's specific tumor. During the trial, an Australian clinic found it had inadvertently treated a patient with a previously imaged brain metastasis. When they took new images, the tumor in the patient's brain was gone.

The investigators persuaded the drug company to open a separate arm of the trial for patients with tumors in the brain. Of the 10 treated, nine saw their tumors shrink.

"This was a seminal moment in melanoma and in brain metastasis," Tawbi says.

A follow-up trial led by Michael Davies, M.D., Ph.D., chair of Melanoma Medical Oncology, showed that brain tumors shrank in 58% of stage IV melanoma patients with a specific mutation in their tumors, when treated with the targeted therapy combination. The tumors began to grow again after six to seven months, but the trial showed that small-molecule drugs could indeed reach tumors in the brain.

Tawbi subsequently led a clinical trial of two drugs that,

when used together, train the immune system to attack cancer. Tumors shrank in 56% of patients in the trial; they disappeared altogether in another 26%. Nine months later, tumors still had not progressed in 59% of patients enrolled in the study.

What's ahead

These and other trials have persuaded some pharmaceutical companies to begin designing drugs against brain metastases, and the FDA has indicated it will require an explanation for excluding these patients from clinical trials.

Fourteen open clinical trials are associated with MD Anderson's Brain Metastasis Clinic, testing a variety of drugs in combination with other therapies. For now, these trials focus on specific cancer types – breast cancer or melanoma, for example.

But soon, Tawbi says, the clinic hopes to offer trials that will be open to all patients with brain metastases, regardless of where their primary tumor started. ♦



Endocrinologist Maria Cabanillas, M.D., calls Becky Nickless into the exam room before delivering good news about her husband, Max.

When time is of the essence

Clinic fast-tracks care for aggressive thyroid cancer

By Meagan Raeke

Max Nickless says he “wasn’t too optimistic” when his wife, Becky, drove him 15 hours from their home in Indiana to see thyroid cancer specialist Maria Cabanillas, M.D., at MD Anderson in February 2017. The outlook from local doctors was so poor that he’d already picked out photos and music for his funeral.

Nickless had anaplastic thyroid cancer – the most aggressive form of the disease. “Anaplastic” is a medical term used to describe cancer cells that divide rapidly.

“Anaplastic thyroid cancer is probably one of the deadliest human cancers,” says Stephen Lai, M.D., Ph.D., professor of Head and Neck Surgery. It’s rare – only about 1,000 cases per year in the U.S. – and most patients die within three to six months after diagnosis.

“When I talked to Dr. Cabanillas on Wednesday, Max was still eating and drinking, and everything was normal,” Becky says. “But by Saturday, he had trouble swallowing, a lot of trouble breathing, and I was really worried about driving him to Houston.”

The cancer’s rapid progression wasn’t unusual. Anaplastic thyroid cancer is so aggressive that by the time many patients are fully evaluated, their disease is often beyond help. Or at least, that’s the way it used to be.

Thankfully, Nickless’ diagnosis came at a time of historic progress in anaplastic thyroid cancer treatment.

Fast help

Several years earlier, Cabanillas, a professor of Endocrine Neoplasia, and her colleagues took on the Herculean task of improving outcomes for anaplastic thyroid cancer patients.

“At that time, we really had nothing to offer them that they couldn’t get at home,” says Cabanillas. “What a disappointment, as a patient, to come to the nation’s No. 1 cancer center and be told to go get chemotherapy at home. We wanted to change that.”

Working with MD Anderson’s Clinical Safety and Effectiveness program, the team first identified doctors in Endocrinology, Medical Oncology, Radiation Oncology and Surgery who could devote special appointment slots in their



Photos: Wyatt McSpadden

Max Nickless’ thyroid cancer began to shrink after he joined a clinical trial of targeted drugs that blocked the cancer’s growth.

clinic schedule each week to anaplastic thyroid cancer patients. The FAST (Facilitating Anaplastic thyroid cancer Specialized Treatment) team was established in 2014, with a committed group of oncologic endocrinologists, medical oncologists, a radiation oncologist, a pathologist, a pulmonologist, and a head and neck endocrine surgeon. The group would work to get patients into treatment faster.

The streamlined system worked. The time to schedule an appointment for new anaplastic thyroid cancer patients dropped from 8.7 days to half a business day by 2018, Lai says.

A groundbreaking trial

Creation of the FAST team coincided with the opening of a clinical trial for several rare cancer types that involved a specific mutation in the BRAF gene. The mutation, known as BRAF (V600E), may increase the growth and spread of cancer cells. Nickless’ tumor had that mutation.

The international trial, led by Vivek Subbiah, M.D., associate professor of Investigational Cancer Therapeutics, was testing dabrafenib and trametinib, a targeted therapy combination that already had success treating melanoma in patients with a BRAF mutation. Targeted drugs block the growth and spread of cancer by interfering with specific molecules that help cancer progress.

Unfortunately, like most targeted therapies, the drugs were in pill form. Since Nickless couldn’t swallow by the time he got to MD Anderson, he was ineligible for the trial. Doctors came up with an alternative. Although Nickless wasn’t in the trial, he would still get the drugs. He received his first dose of dabrafenib through a feeding tube.

“I remember asking Dr. Cabanillas when I would know if the dabrafenib was going to help. She said I would know within two days,” Nickless recalls.

He and Becky didn’t wait in Houston to find out.

“Becky was trying to get me home before I passed away so the kids could see me,” he says. “That was our main concern.”

Two days later, Nickless realized he’d regained the ability to swallow when he started craving a soda on the drive back to Indiana. The dabrafenib was working as quickly as Cabanillas had predicted. Nickless’ tumor continued to shrink, and he began receiving trametinib about a month later.

More than half the anaplastic thyroid cancer patients who qualified for the trial saw their tumors shrink. In May 2018, the Food and Drug Administration approved dabrafenib and trametinib for anaplastic thyroid cancer patients with the BRAF (V600E) mutation. It was the first drug therapy ever approved to treat the disease.

“We learned a lot about how to design clinical trials that are specifically for anaplastic thyroid cancer,” Cabanillas says.

For example, a later trial allowed other drug delivery methods for patients who couldn’t swallow.

Thanks to the FAST team, more than 30% of anaplastic thyroid cancer patients at MD Anderson now enroll in clinical trials. One reason clinical trial enrollment is so much higher than the national average of 3% to 5% is MD Anderson’s use of a liquid biopsy, or blood test, that looks for mutations in cancer cells that are circulating in the blood. The goal is to target these mutations with drugs specifically designed to attack them.

“Traditionally, a tissue biopsy is taken from a patient’s tumor, then analyzed in the lab for mutations. The results often take weeks to come back, and these patients can’t wait that long,” says Jennifer Wang, M.D., assistant professor of Head and Neck Surgery. “Now, we’re able to order the liquid biopsy. Results usually come back within a week, which allows us to choose targeted drugs within a reasonable timeframe.”

Photo: F. Carter Smith



Surgeon Mark Zafereo, M.D., operated on Nickless' tumor after it had shrunk enough to be surgically removed.

Combating resistance

Some tumors treated with the targeted therapy combination that Nickless received eventually grow back, a problem known as resistance. When it became clear that Nickless' tumor was starting to grow again, his doctors added the immunotherapy drug pembrolizumab to his treatment plan. Immunotherapy drugs train a patient's own immune system to attack cancer.

Nickless' care team hoped the immunotherapy would help control his tumor growth, but they didn't stop there. They knew that when patients responded well to targeted therapy, their tumors shrunk enough to be removed with surgery – something that was almost never done before for anaplastic thyroid cancer.

"Traditionally, these tumors have been non-operable because they involve critical structures in the neck, such as the carotid artery or voice box," says Mark Zafereo, M.D., associate medical director of MD Anderson's Endocrine Center. "But once patients had such a dramatic response to targeted therapy, we realized we could re-introduce surgery into the multidisciplinary care model and improve survival while still preserving quality of life. Surgeons have been historically reluctant to operate on anaplastic thyroid cancer patients because the prognosis has historically been so bad, so this is a paradigm shift."

Zafereo successfully removed Nickless' entire tumor in May 2017. Nickless then underwent 30 doses of radiation therapy. He stopped taking pembrolizumab in September 2019. Today, he remains cancer-free. He welcomed his fifth grandchild in February 2020, three years after his diagnosis.

Changing the trajectory

In the August 2019 cover article of the journal *Thyroid*, MD Anderson published the first case studies to show that treat-



We're always trying to change the status quo. We want to lead and do everything possible to change the trajectory for these patients.

Jennifer Wang, M.D.
Physician

ing BRAF-mutated anaplastic thyroid cancer with dabrafenib and trametinib, followed by surgery and radiation, was safe and effective. In November, the team presented survival data during the Annual Meeting of the American Thyroid Association. Average overall survival at MD Anderson for anaplastic thyroid cancer doubled after the FAST team formed, from eight months in 2000-2013 to 16 months in 2017-2019, with more than 40% of patients surviving at least two years.

With the launch of MD Anderson's Rare Tumor Initiative, which aims to identify additional molecular and genetic targets for the next generation of therapies for rare tumors, and two new clinical trials for anaplastic thyroid cancer opening soon, the team hopes to continue improving the care, survival and quality of life for all patients diagnosed with this once hopeless disease.

"At MD Anderson, how cancer is treated is constantly evolving. We're always trying to change the status quo," Wang says. "We want to lead and do everything possible to change the trajectory for these patients." ♦

Photo: Adolfo Chavez III



THE POWER WITHIN

Amir Jazaeri, M.D., led a clinical trial testing TIL cells for the treatment of cervical cancer. The trial was so successful that the Food and Drug Administration granted TIL therapy a breakthrough designation to expedite its development.

Tumors harbor cancer cells — and a cancer-fighting weapon

By Lany Kimmons

When it comes to killing cancer, T cells are some of the most important players in the field of immunotherapy.

Typically, T cell therapy involves extracting T cells from a patient's blood. These T cells are reprogrammed in the lab to recognize and attack cancer cells, multiplied to make more, then infused back into the patient so they can start attacking cancer cells. This process is known as adoptive cell therapy.

But sometimes, T cells are removed directly from the tumor.

Why use T cells from a tumor itself?

"These T cells actually navigated to the tumor, so they're ahead of the game. They must already recognize something threatening about the cancer cells," says Amir Jazaeri, M.D., professor of Gynecologic Oncology and Reproductive Medicine. "What better place to find T cells reacting against the cancer than in the cancer itself?"

How TIL therapy works

T cells are a type of lymphocyte – white blood cells that fight infection and disease.

TILs, or tumor-infiltrating lymphocytes, are T cells found inside some tumors. In TIL therapy, TILs are collected from the tumor during a biopsy or surgery. They're then multiplied in the lab using interleukin-2 (IL-2), a protein that promotes rapid TIL growth. Once grown to billions in number, the TILs are infused back into the patient, where they attack cancer cells while leaving healthy cells alone. Before the TIL infusion, patients undergo chemotherapy to help the TIL attack the tumor. Patients undergo close monitoring. "This is not a treatment that can be safely administered to everyone," says Rodabe Amaria, M.D., assistant professor of Melanoma Medical Oncology. "We do a lot of screening to make sure the heart and lungs can tolerate the high doses of chemotherapy and IL-2."

TIL therapy for cervical cancer

Until recently, TIL therapy was primarily used to treat melanoma. In fact, the National Cancer Institute first began using TIL therapy to treat melanoma patients in 1986. Patrick Hwu, M.D., head of MD Anderson's Cancer Medicine division, left the NCI in 2003 to start MD Anderson's TIL program.

Today, TIL therapy is being used to treat

 **How T cell therapy works:**
mdanderson.org/Tcell19

more cancers, including colorectal, bile duct, breast, and now, cervical cancers.

Jazaeri recently led a study in which almost half of advanced cervical cancer patients who received TIL therapy saw improvement.

Out of 27 patients in the clinical trial, three had no visible signs of cancer after the therapy, nine saw their cancer shrink, and 11 saw their cancer stabilize. These results were so impressive that the Food and Drug Administration granted TIL therapy a breakthrough designation to expedite its development so it could be used to treat more cervical cancer patients sooner.

Trials are now underway to test TILs in sarcomas, pancreatic cancer, colorectal cancer and other gynecologic cancers.

"The whole reason we can do these trials at MD Anderson is the cooperative team effort," says Jazaeri. "It's as much a success of collaboration at MD Anderson as it is a medical innovation." ♦

Photo: F. Carter Smith



James Kelley, M.D., Ph.D., assistant professor of Laboratory Medicine, and Dee Gallardo, executive director for Nursing, co-lead the Hemovigilance Unit which closely monitors blood transfusion patients.

FIRST OF ITS KIND

A collaborative effort is changing the way we care for blood transfusion patients

By Kelly Calagna

In a continued effort to provide patients with the best care, MD Anderson has developed a first-of-its-kind Hemovigilance Unit to virtually monitor patients before, during and after a blood transfusion.

The Hemovigilance Unit (HUV) is a collaborative effort between the Nursing, Laboratory Medicine and Information Technology departments that brings patient care, transfusion medicine and technology together in an innovative way.

“We were looking at how to better identify transfusion reactions and respond in a meaningful manner,” says James Kelley, M.D., Ph.D., assistant professor and laboratory director in Laboratory Medicine, who co-leads the HUV with Dee Gallardo, executive director for Nursing.

The concept of a centralized virtual hub for patient monitoring is not new to medicine. Hospitals have had cardiac telemetry units that allow for continuous monitoring of patients’ hearts for decades. However, it was Carol Porter, D.N.P., chief nursing officer and senior vice president for Nursing, who envisioned using the concept for blood transfusion monitoring at MD Anderson.

“Giving a transfusion to a cancer patient is a different treatment because their bloodwork is different. They may not react the same as a person who doesn’t have cancer,” says Porter.

Cancer treatment’s side effects can often mirror the warning signs of an adverse transfusion reaction, making reactions more difficult to identify in cancer patients. Porter and her team saw this as an opportunity for MD Ander-

son to lead the way in detecting, responding to and preventing transfusion reactions.

An unprecedented approach to transfusion care

To develop this unprecedented multidisciplinary approach, nurses and transfusion specialists worked with computer engineers to design an intuitive tool capable of sorting through patient data to identify high-risk patients and to offer real-time support to front-line staff. Using this tool, the HUV can inform a care team about a patient’s transfusion-related risks before, during and after a blood transfusion, so they can intervene, if necessary.

“There’s so much more data. You’re not one nurse with one patient,” explains Porter. “There’s a whole group that’s connected.”

Photo: Wyatt McSpadden



Hemovigilance Unit supervisor Tonita Bates, standing, and transfusion nurse coordinator Colleen Villamin review a patient’s vital signs.

Photo: Adolfo Chavez III



Chief Nursing Officer Carol Porter, D.N.P., left, and Chief Operating Officer Rosanna Morris, right, visit clinical areas.

The HUV’s on-call unit of nurses and advanced practice providers is able to remotely monitor vitals of every transfusion patient at MD Anderson’s Texas Medical Center Campus, as well as its locations in The Woodlands, West Houston, League City and Sugar Land.

If a patient shows any sign of an adverse reaction, the unit can send a practitioner to the patient’s bedside quickly.

“If the HUV nurses take note of an increase in a patient’s transfusion reaction score and there’s a suspicion of a transfusion reaction, they’ll contact their advanced practice provider HUV colleague, who deploys to the patient’s

location, if warranted. When on the scene, the HUV advanced practice provider speaks with the primary nurse, evaluates the patient, and also collaborates with the primary advanced practice provider or attending physician to render care,” explains registered nurse and certified nurse practitioner Tonita Bates, who supervises the Hemovigilance Unit’s staff of specially trained nurses and advanced practice providers.

“When caring for patients, you need as much support, as much reinforcement and as many eyes as you can, and that’s what the Hemovigilance Unit does. It allows our out-



Us being at our best means that we are that much closer to ending cancer.

Rosanna Morris
Chief Operating Officer

standing nurses to have this invisible backup helping to monitor and manage what is happening,” adds Rosanna Morris, MD Anderson’s chief operating officer, who oversees inpatient and outpatient operations.

Data provides new insights

The specialized unit oversees between 20 and 200 patients each day. Blood transfusions are the most common inpatient procedure at MD Anderson. Last year, the center transfused more than 190,000 blood products, or about 1% of the nation’s total transfusion procedures.

Using the data collected and analyzed by the HUV, the large number of transfusions at MD Anderson will now offer scientists new insights into transfusion medicine.

By collecting data on the different factors that may possibly impact the success of a blood transfusion, researchers can analyze and identify new variables that may influence an adverse reaction.

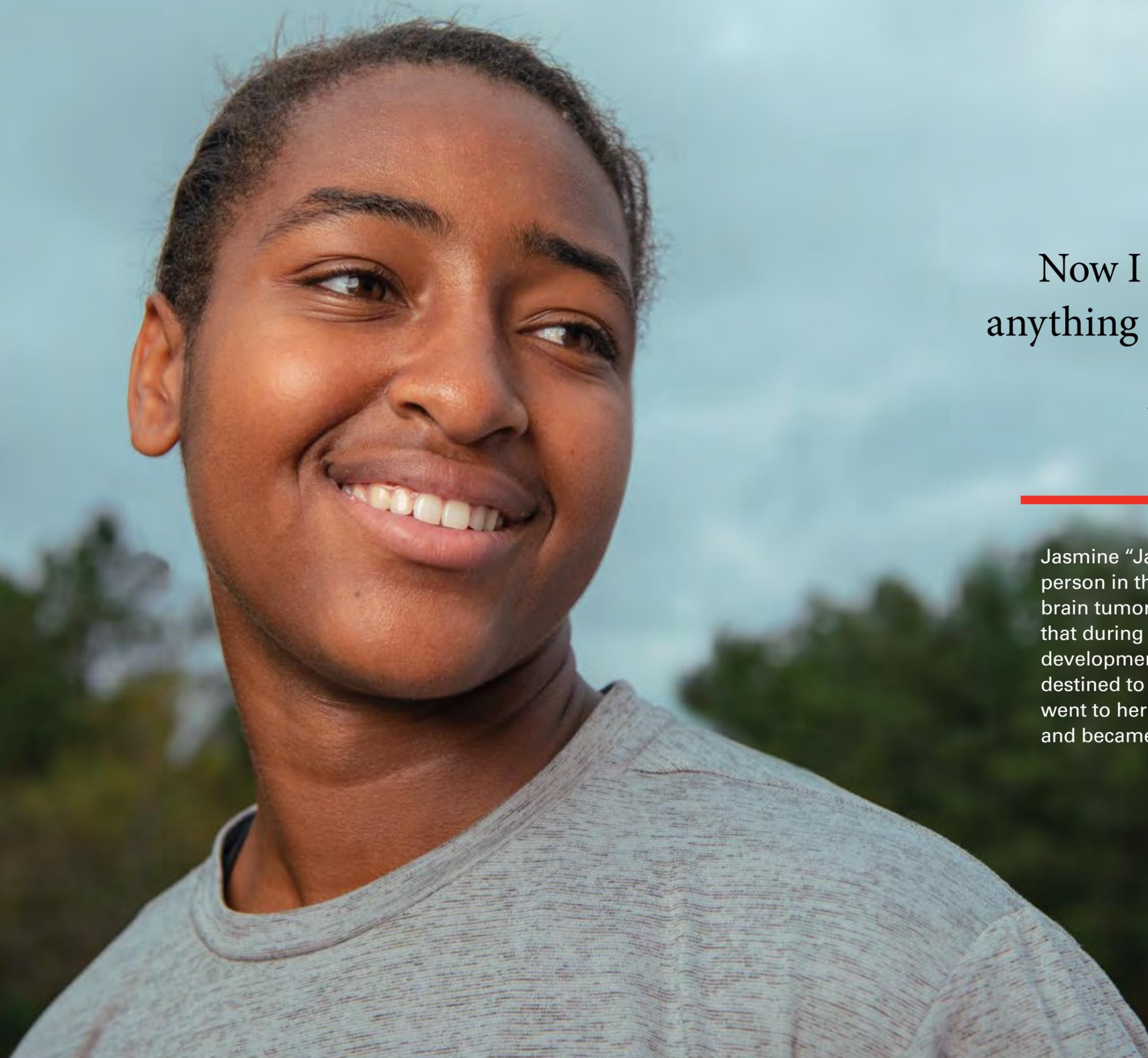
“Once we know those patterns, and that structure is figured out as an algorithm, every time a patient receives a transfusion, we can put all the new variables into the system and in real-time be able to predict which patients may or may not have a reaction,” says Kelley. “We’re actually building artificial intelligence models around these data so that we can build a human-machine hybrid.”

The success of the HUV and the data it offers have the potential to “impact patients, potentially worldwide, on a safer way to give blood products,” says Porter.

“We are creating – as a team and as a hospital – a new standard,” she says.

Morris agrees.

“The Hemovigilance Unit is yet another example of the great work, the great research and the great innovation that has come from MD Anderson,” she says. “Us being at our best means that we are that much closer to ending cancer. And that’s what this team is all about.” ♦



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Now I know I can handle anything that’s thrown my way.

Jazzy Richards
Survivor

Jasmine “Jazzy” Richards is the only known person in the world to be diagnosed with a brain tumor in the bladder. Doctors believe that during the earliest stages of embryonic development, one of Jazzy’s cells, which was destined to become a brain cell, mistakenly went to her bladder. Years later, it mutated and became cancerous.



Jazzy Richards' parents, Carolyn and Walter, stayed by their daughter's side during her treatment and recovery.

BACK IN THE GAME

An unusual diagnosis was no match for MD Anderson's experts – or college soccer player Jazzy Richards

By Ronda Wendler

As a soccer player for the University of Oklahoma, Jasmine Richards is used to being in the spotlight. But now she's making headlines for another reason. "Jazzy," as friends and family call her, is the only known person in the world to be diagnosed with a brain tumor in her bladder.

"She's completely unique," says Ashish Kamat, M.D., Jazzy's doctor and a professor of Urology at MD Anderson. "A type of tumor that normally develops in the lining of the brain originated in her bladder instead. This just doesn't happen."

Jazzy's cancer story began in summer 2018, when she collided with another player on the field during soccer practice. Shortly afterward, her back began to hurt, and she noticed blood in her urine. That's when she sought medical attention at an Oklahoma hospital.

At first, emergency room doctors presumed Jazzy had a bruised kidney. But a CT scan revealed a small mass in her bladder – perhaps a blood clot, doctors thought. But when a urologist biopsied the suspicious tissue and sent it to a lab for analysis, the results that came back were troubling – and perplexing.

Jazzy had cancer, the report said, but it didn't look like bladder cancer anyone had seen before.

"It looked unusual under the microscope, and they weren't even certain it was bladder cancer," Jazzy recalls. "Something wasn't adding up."

The hospital referred Jazzy to a urologist, who jotted down names of three top cancer centers in the country and told her to pick one. She chose MD Anderson in Houston because it's near her parents' home and is ranked first in the nation for cancer care.

An unusual patient

Kamat, who specializes in complicated cases, was taken aback when Jazzy arrived at his clinic.

"She was only 18 years old," he says. "The average bladder cancer patient is 70."

Kamat performed another biopsy. Once again, pathologists – this time at MD Anderson – were puzzled. Their analysis revealed the tumor was an ependymoma, an aggressive type of cancer that forms in the lining of the brain. So why was it in Jazzy's bladder?

"I'd never heard of this before, and neither had our pathologists. But maybe someone else had," says Kamat, who is president of two groups – the International Bladder Cancer Group and the International Bladder Cancer Network, whose members are the top physicians and scientists in the field. "I was on a mission to find a doctor who'd treated a patient with Jazzy's same diagnosis. I wanted a road map for what to do next."

He first queried MD Anderson's brain tumor specialists, but none had ever seen a case like Jazzy's. Next, he contacted specialists at major cancer centers across the country, then around the world. Every time, the answer was the same: ependymomas don't occur in the bladder.

"Hundreds of the world's leading bladder and brain cancer experts put their heads together, but we were all left scratching our heads," Kamat says. "No one had encountered a brain tumor in the bladder."

The group carefully considered how this could have happened. They arrived at what Kamat says is the only logical explanation: a phenomenon in the field of anatomy known as "drift."

Here's how it happens: All newly developing humans begin as a single cell resulting from the fusion of a female egg and a male sperm. In the uterus, this lone cell divides again and again into multiple cells, with each one destined to become a specific type – for example, a bone, cardiac or lung cell. The cells then migrate to their intended location where they help build organs and structures in the body.

"Perhaps one of Jazzy's cells that was meant to become a brain cell mistakenly went to the bladder, where it hung around, mutated and became cancerous," Kamat says. "It's the only hypothesis that makes any sense."

No standard treatment

Scientists have documented cases involving drift throughout history, but no one had seen a case like Jazzy's. Bottom line: Kamat was navigating in uncharted territory. With no prior knowledge to draw upon, he had no way of knowing what treatments would and wouldn't work for his first-of-a-kind patient.

"We have well-established ways of treating commonly occurring cancers," Kamat says. "But in Jazzy's precedent-setting case, we didn't have that advantage."

He met with Jazzy and her parents, Carolyn and Walter Richards, and proposed two options: Monitor the tumor, and if it grows, remove the entire bladder to prevent the tumor from spreading. Or, remove the bladder now.

"If Jazzy's tumor had developed in her brain, we know it would have behaved very aggressively," Kamat explains. "Surgical removal would be the only way to treat it. Chemotherapy wouldn't work, because ependymomas are generally chemo-insensitive."

But Jazzy's tumor was in her bladder, not her brain, so perhaps it would behave differently. Kamat considered removing the tumor while leaving her bladder in place. But after intense discussions with colleagues, he dismissed the idea.

"That's a gamble we weren't willing to take," Kamat says. "What if the tumor grew back and spread quickly?" he says. "We'd be out of options."

He thought about his daughter, who is close in age to Jazzy.

"If Jazzy were my daughter, I'd want to do all I could to give her the best chance for a future," he says. "I'd remove the bladder."

Jazzy and her parents agreed without hesitation.

"Jazzy can live without a bladder," says Carolyn, "but we can't live without Jazzy."

Weighing the options

Now the Richards family faced yet another decision. Once Jazzy's bladder was removed, Kamat could build her a new one using tissue from her small intestine. Or, Jazzy could do without a bladder and wear an external pouch called a urostomy bag for urine collection.

The first option – constructing a new bladder – is one of the most complicated surgeries performed at MD Anderson, Kamat says.

"Think of the bladder as a balloon," he explains. "The round, inflatable part of the balloon is the bladder where urine is stored. The balloon's mouthpiece is the bladder's neck. This neck connects to the urethra, a tube that carries urine out of the body."

If Jazzy decided on a new internal bladder, Kamat would need to remove her old one but leave the neck of her original bladder in place. He'd then hook her new, man-made bladder up to her old bladder neck.

This could invite trouble, Kamat cautions.

"Cancer cells from Jazzy's original tumor could be lurking in the neck of her original bladder," he explains. "There's a risk these cells could spread into her new bladder."

And there's one more downside: Jazzy would need to train her new, man-made internal bladder to function properly.

"It takes about seven to eight months to train a replacement bladder," Kamat says. "You're like a toddler going through toilet



Photo: Thomas Campbell

Ashish Kamat, M.D., says Jazzy is a "one-of-a-kind" patient.



It's a tremendous advantage to have experts from all different fields working together at one institution to care for a patient.

Ashish Kamat, M.D.
Physician

training. You have accidents."

Jazzy turned down the internal bladder, choosing the external bag instead.

"I wanted to have the best chance of continuing to play soccer and the lowest possibility of the cancer coming back," she says. "If that meant wearing a urostomy pouch, then that was the choice I felt was best."

Back in the game

Once Jazzy made her decision, it was "off to the races," Kamat says.

"She was focused and determined. I told her, 'It's just like soccer. I'm the coach, you're the player. Listen to me and follow my instructions. We'll do this together.'"

Jazzy was the perfect patient. Six weeks after her surgery was completed by Kamat and a team of reconstructive surgeons, she returned to school. Her flawless 4.0 grade point average never faltered.

Little by little, she became stronger as she followed Kamat's guidelines about how to build up her endurance.

When soccer season began last August, she was back on the field. Carolyn watched from the stands and cried tears of joy when her daughter scored her first-ever goal against The University of Texas.

"Cancer sidelined Jazzy most of her freshman year. Not participating was hard for her," Carolyn says of her daughter, who in high school scored more points and goals than any other



Photo: Wyatt McSpadden

Today, a year after surgery, Jazzy is cancer-free.

player in her school's history and was named Most Valuable Player in her district.

Today, a year after surgery, Jazzy is cancer-free. She visits MD Anderson every three months for checkups. As time goes by, she'll return less frequently. Eventually, she'll be seen once a year, then every other year.

"Should another patient someday be diagnosed with a brain tumor in the bladder, their health care team can look to Jazzy's case for treatment guidance," Kamat says.

He applauds the multidisciplinary team of MD Anderson experts who weighed in on Jazzy's case, including pathologists, neuro-oncologists, urologists and others.

Providers from multiple disciplines met to discuss Jazzy's case when she was first admitted, recalls John de Groot, M.D.,

professor of Neuro-Oncology.

"We all listened and learned from each other," he says. "Then, we developed a treatment plan we believed would work best."

"It's a tremendous advantage to have experts from all different fields working together at one institution to care for a patient," Kamat says.

Now a sophomore accounting major, Jazzy says she "gives thanks every day" for her health care team. She's happy to be back among friends and focusing on the future.

"I believe in staying grounded and taking life in stride, but this experience really challenged me," she says. "Now I know I can handle anything that's thrown my way." ♦



Karen Moody, M.D., is co-developer of a conversation guide that helps doctors and nurses explain treatment options to pediatric patients and their parents.

Will better communication improve experience for kids?

By Katrina Burton

What's the best way to communicate with parents of children who have a particularly challenging cancer diagnosis? Karen Moody, M.D., associate professor of Pediatrics, and colleagues have developed a conversation guide and visual aids designed to help pediatric oncologists and nurses discuss treatment options and goals with parents of children facing a poor prognosis.

"We found that patients had less pain and emotional distress, and parents felt less uncertain about the future and more hopeful when they were completely informed about their treatment options and knew what to expect during treatment," says Moody, who leads the Pediatric Integrative Medicine and Supportive Care program at MD Anderson.

The program hosts weekly meetings attended by oncologists, palliative care and pain specialists, child life specialists, integrative medicine and creative arts therapists, ethicists, social work counselors, psychologists, and nurses. This multidisciplinary team helps parents identify their values and those of their child and set realistic goals for care that align with those values.

"Every patient's needs are different, and we see patients from a variety of backgrounds and cultures," says Moody. "To ensure each family receives the support they need, it's necessary for the entire team to be aligned with the family."

Music therapy, yoga or creating art through MD Anderson's Arts in Medicine Program takes some children's minds off treatment. Others may focus on a lifestyle-based approach involving diet and exercise.

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It's important for families to know there are options for them.

Karen Moody, M.D.
Physician

"It's important for families to know there are options for them," Moody says. "I find that patients feel less anxious when they understand what those options are, and when we can help incorporate specific supportive services into their care."

The conversation guide, developed by Moody in collaboration with registered nurses Joan Haase, Ph.D., of Indiana University, and Verna Hendricks-Ferguson, Ph.D., of St. Louis University, will soon be tested at MD Anderson and five other hospitals, with support from a National Cancer Institute grant. The guide was recently pilot-tested with success at Riley Hospital for Children in Indianapolis and Cardinal Glennon Children's Hospital in St. Louis.

"We're hoping our guide will serve as a model for pediatric supportive care programs around the country," says Moody. "I envision it being a pocket tool physicians can use to better explain treatment options to patients and their families, and to help them pivot to the appropriate care when needed." ♦

Personalized computer models help patients get **BACK ON THEIR FEET**

By Sarah Zizinia

What is the best surgical option for patients with cancer of the pelvis, the ring-shaped bone that anchors the spine and the hips? A new research project will help doctors decide.

“Few cancer surgeries are as invasive or difficult to recover from as those involving the pelvis,” says Valerae Lewis, M.D, chair of Orthopaedic Oncology at MD Anderson. “Removing parts of the pelvis can keep patients off their feet for more than a year.”

Now, Lewis and Benjamin Fregly, Ph.D., professor of Mechanical Engineering and CPRIT scholar in cancer research at Rice University, are working together to create personalized computer models for pelvic cancer patients waiting to undergo surgery for bone cancer of the pelvis. The models can predict which reconstruction option will last the longest and will get patients back up and walking in the shortest amount of time.

For pelvic cancer patients, those options include removing the cancerous portion of the bone with no reconstructive surgery, reconstructing the removed section using a combination of cadaver bone and metal implants, or a custom-designed, man-made pelvis.

“Each option has its advantages and disadvantages, and what’s best for one person may not be best for another,” says Lewis, one of the country’s leading orthopaedic cancer surgeons. “There’s no ‘one size fits all.’”

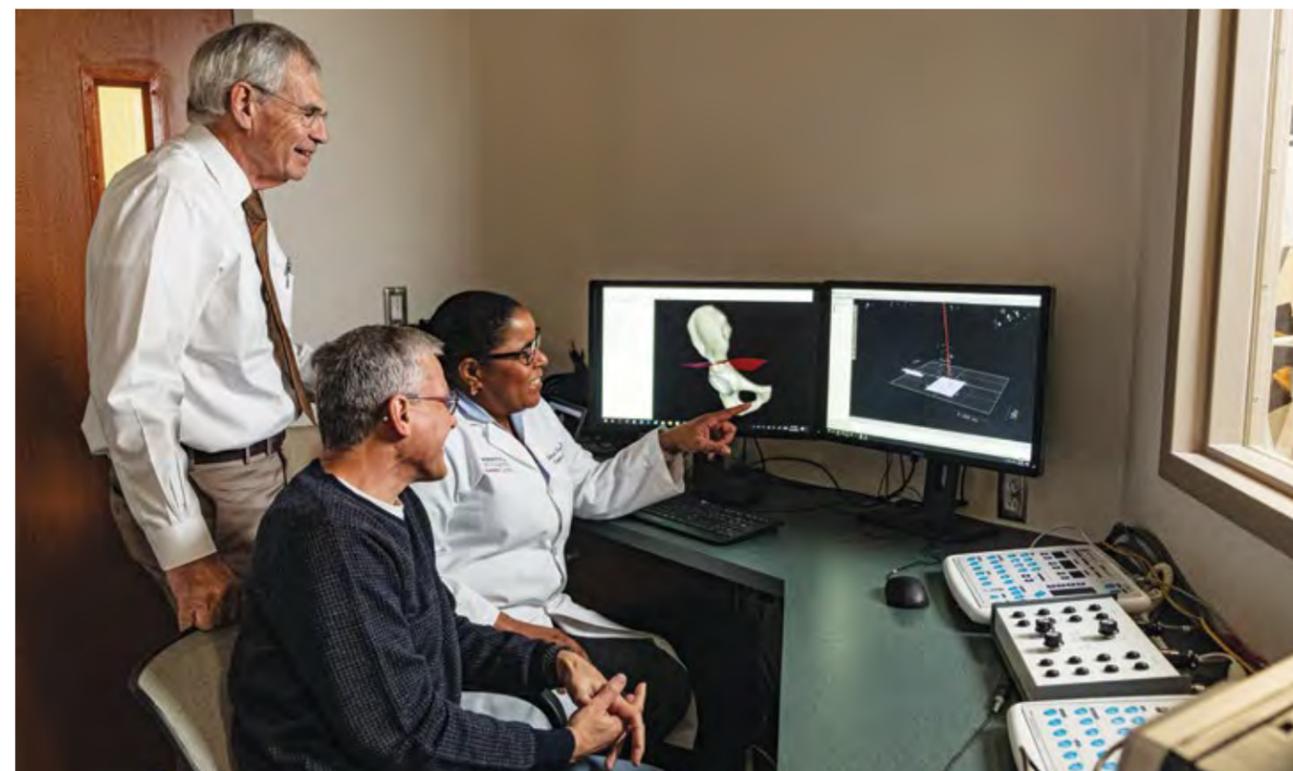
Simulating recovery

Using motion capture technology similar to that used in the film industry, Fregly and his team are building customized computer models of Lewis’ patients to simulate how they will function after each possible treatment option.

Patients are outfitted with electrodes and reflective markers that measure muscle activity and track body motion as they walk across the floor of the Biomotion Lab, located on the nearby campus of The University of Texas Health Science Center. These data are used to create a personalized computer model of the patient, which the research team uses to



Physical therapist Alexander Penny demonstrates the motion capture technology that tracks patients’ muscle activity while walking.



MD Anderson orthopaedic oncology surgeon Valerae Lewis, M.D.; Rice University mechanical engineering professor B.J. Fregly, Ph.D.; and James Kellam, Ph.D., director of the Biomotion Lab at The University of Texas Health Science Center (standing), analyze imaging results.



Lewis, Fregly and Kellam work together to build customized computer models that predict how a patient will function after surgery.



Few cancer surgeries are as invasive or difficult to recover from as those involving the pelvis.

Valerae Lewis, M.D.
Physician

surgeons map out prior to surgery where they will cut bone. This minimizes unnecessary removal of bone and muscle.

Fregly says this five-year research project, funded by the Cancer Prevention and Research Institute of Texas, couldn’t have happened without a collaborative team.

“Rice is handling the computational modelling and 3D printing, MD Anderson is providing us with patients and clinical problems to address, and The University of Texas Health Science Center is doing the pretreatment testing,” explains Fregly. “It takes all of us to make this project go.” ♦

predict how the patient will walk after different surgical or rehabilitation treatments.

Not only that, but the data can also allow the research team to print custom 3D prostheses that may potentially help patients get back on their feet sooner.

“Custom pelvic prostheses have great

potential, but the ones that are currently available clinically are not reliable,” Fregly says. “That’s an engineering problem we’re in a good position to tackle.”

And the same 3D imaging data used to design a prosthetic pelvis can be used to make custom surgical cutting guides, which help

Photos: Jeff Fillow

Driven by memory of her mother

Pancreatic cancer researcher sets her sights on a cure

By Scott Merville

Newly graduated from medical school in her native Argentina in 2002, Florencia McAllister, M.D., joined a lab in New Orleans where she used gene therapy to defend the body against opportunistic fungal and bacterial infections.

After many pioneering findings, McAllister trained to become a gastrointestinal medical oncologist – a highly specialized doctor who treats cancers of the stomach, liver, bile duct, gallbladder, pancreas, bowel and esophagus. She thought her days studying bacterial immune response were over.

“I was saying, ‘I’m done with this. I want to go study tumor biology and tumor immunology,’” she recalls.

But McAllister wasn’t done with bacteria.

A new approach

Recently, McAllister, now an assistant professor of Clinical Cancer Prevention, published striking findings in the journal *Cell*, raising the possibility of transplanting feces from a healthy donor into a pancreatic cancer patient to fight the disease.

McAllister and colleagues reported:

- ◆ The rare long-term survivors of pancreatic cancer have a distinctive bacterial signature, or microbiome, on their tumors that is con-

nected to a strong immune response against the cancer.

- ◆ Using fecal transplants from these long-term human survivors to alter the tumor microbiome in laboratory mice who had pancreatic cancer greatly prolonged their survival.

“Results of our experiments represent a significant opportunity to improve pancreatic cancer treatment by altering the tumor immune microenvironment,” McAllister says. “There’s promise here, but we have a lot of work ahead.”

A fecal transplant clinical trial is under development and is expected to open in 2020.

More research needed

McAllister is applying a full-court press to the disease, which took her mother’s life at age 55.

In addition to her lab research and mentorship of young scientists, McAllister treats patients and directs MD Anderson’s high-risk pancreatic cancer clinic, devoted to finding ways to catch the disease early when it’s still treatable, or even better, to prevent it outright.

“Florencia’s a phenomenal physician-scientist who is working on critically important questions of pancreatic cancer and how to both treat and prevent it,” says Powel Brown, M.D., Ph.D., chair of Clinical Cancer Prevention.

“Her work fulfills the goal of a physi-

cian-scientist – to do discovery research in the lab, have an impactful finding that will eventually lead to treatment and then have the wherewithal to take it to clinical trial.”

Only 20% of pancreatic cancer patients are diagnosed when the disease is still in its early stages and surgery is possible, making survival more likely. Treatment options are few for the 80% whose disease has advanced, with only 5% to 7% surviving to five years.

While surgical patients have better survival – more than 40% of MD Anderson patients who receive chemotherapy before surgery live at least five years – progression can still be swift.

McAllister’s mother had chemotherapy and a surgery known as the Whipple procedure, in which surgeons remove the wide part of the pancreas, the first part of the small intestine, the gall bladder and the bile duct. Those who undergo the operation may have a five-year survival rate of up to 25%.

“I was a postdoc at the University of Pittsburgh when she was diagnosed,” McAllister recalls. “I was in the bed next to her the night before her surgery and during the two weeks of recovery time, writing my papers and grants.”

Despite surgery and chemo, the disease eventually spread to her liver, and McAllister’s mother passed away 16 months after her diagnosis.



Photo: Nick de la Torre

Florencia McAllister, M.D., was inspired to become a pancreatic cancer doctor and researcher after her mother and grandfather died from the disease.

“It was very difficult,” McAllister says. “She remains a big motivation for me.”

Looking back

McAllister first became interested in research while studying at the National University of Rosario Medical School in Rosario, Argentina. She landed a research fellowship in the lab of Jay Kolls, M.D., now a professor at Tulane University.

“I had no real research experience, but Jay sort of took a risk,” she says.

She participated in a series of findings about the cytokine interleukin-17, a protein that helps cells “talk” to each other and is especially important in the immune system, and the Th17 CD4 helper T cell, which plays a key role in a healthy immune system’s functioning.

Later, during a research fellowship at Johns Hopkins University, she showed a connection between interleukin-17 and early cellular changes that lead to pancreatic cancer.

Her team noticed Th17 T cells around pancreatic cancer, apparently in response to bacteria, leading McAllister to wonder whether bacteria had a role in cancer and setting her on the path to the microbiome discoveries.

High-risk clinic

MD Anderson hired McAllister from Johns Hopkins to continue her research and to develop the high-risk clinic, where first-degree relatives of pancreatic cancer patients can come to be tested for inherited genetic variations that can raise their risk of developing the disease.

All MD Anderson pancreatic cancer patients receive genetic testing. About 10% test positive for risk-raising mutations, which means their close relatives also need testing.

Relatives also are monitored for other risk factors, such as chronic inflammation and cysts in the pancreas. When warranted, imaging is done to screen for cancer.

“Recently, research revealed that new-on-

set diabetes can be a risk factor in developing pancreatic cancer,” McAllister says. “As a result, lab tests to detect diabetes are now included in high-risk clinic visits.”

The clinic also conducts studies to identify proteins, DNA or other biomarkers that can be tested to confirm the presence or absence of cancer. The goal is to use these biomarkers to identify and treat pre-malignancies, and to develop clinical trials aimed at preventing pancreatic cancer.

Colleagues say McAllister is ideally suited to make progress against the disease.

“Florencia is one of the most creative, compassionate and hard-working physician-scientists I have met,” says Anirban Maitra, M.B.B.S., scientific director of the Sheikh Ahmed Bin Zayed Al Nahyan Center for Pancreatic Cancer Research and co-leader of MD Anderson’s Pancreatic Cancer Moon Shot®. “She’s made finding a cure for this terrible disease the central mission of her life.” ◆



Photos: Andre Santos

Nobel Prize winner and harmonica player Jim Allison, Ph.D., performs with the Checkmates, a talented band of MD Anderson musicians.

Cancer innovators band together to make music

By Scott Merville

The Checkmates, a versatile band of MD Anderson musicians with an eclectic playlist and increasing presence in the community, owes its existence to a less than stellar jam session.

At a scientific meeting about 15 years ago, Patrick Hwu, M.D., now head of Cancer Medicine, and colleague Tom Gajewski, M.D., Ph.D., of the University of Chicago, arranged an open-microphone, after-hours music session for immunology experts to showcase their musical and vocal skills.

“It was a total train wreck,” Hwu recalls. “We weren’t organized. No one was singing. It was horrible.”

One of the few who tried to sing, a scientist who will remain nameless, tried to belt out “Wild Thing.”

“He didn’t know all the words!” Hwu recalls. “There are only a few words in ‘Wild Thing.’ So, kind of awful musically, but also lots of fun.”

First, the Checkpoints

After learning that some of their colleagues at other institutions also are musicians, Hwu, Gajewski and harmonica player Jim Allison, Ph.D., chair of Immunology at MD Anderson,

 **Watch the Checkmates perform:**
mdanderson.org/checkmates19

were inspired to form the Checkpoints, which now is the house band of the Society for Immunotherapy of Cancer. The band is named for the Nobel Prize-winning checkpoint blockade cancer immunotherapy invented by Allison, which removes a “brake” – or checkpoint – on immune cells and thereby frees them to attack cancer.

The Checkpoints play at two scientific meetings each year, gathering from around the country to practice the day before each performance, then scattering afterward. Their performances routinely draw 600 to 700 people. Saxophone player Ferran Prat, Ph.D., J.D., MD Anderson’s senior vice president for Strategic Industry Ventures, caught a show in Chicago and volunteered to introduce woodwinds to the band.

Prat and pianist Hwu began having regular jazz nights at Hwu’s house, joined by an ever-changing parade of MD Anderson musicians.



Patrick Hwu, M.D., handles the keyboards, while Christina Boulton, Daron Gilmore and Jim Allison belt out the blues.



Ferran Prat, Ph.D., J.D., adds some soulful notes.

“Seriously, I Googled, ‘MD Anderson bass player,’” Hwu recalls.” Up popped a bio of Adela Justice, senior librarian at The Learning Center.

“Ex-cop, librarian, bass player – perfect,” says Prat.

Hwu cold-called Justice, who joined the Checkmates.

“She’s a total musician, went to High School for the Performing and Visual Arts, a music major in college – she’s played professionally. She’s the best,” Hwu says.

Christina Boulton, office manager in Research Administration, and Daron Gilmore, IT support system analyst in Cancer Medicine, front the band with soaring vocals, with Allison growling select songs.

Prat connected with trumpet player Powel Brown, M.D., Ph.D., chair of Clinical Cancer Prevention, who helped the Checkmates fill out their horn section with Scott Krueger on trombone and Kyle Krueger on bass saxophone. The father and son duo are the only non-MD Anderson musicians in the group.

“The horns bring a completely different dimension,” Hwu says.

He plays a digital recording of the Checkmates’ version of Bruno Mars’ song “Uptown Funk” from a recent gig.

“They nailed it!” he exclaims.

A ton of fun

The strength of the local band is regular practice.

“We can play harder songs in the Checkmates,” Prat says. “You can’t play Stevie Wonder cold.”

They perform at a variety of MD Anderson events and occasional benefits for cancer-related charities in Houston.

The band feels like a microcosm of MD Anderson, Prat says, with members who work in the clinic, researchers, faculty, staff and administrators.

“In the band, we’re all the same,” Hwu says. “It’s beautiful. We love each other; it’s a ton of fun. Every time we play, we think, ‘Why don’t we do this more often?’” ♦



“

How wonderful to know that,
as a patient, my preferences
and needs are respected.

Toni Vasquez Jordan
Survivor

When MD Anderson employee Toni Vasquez Jordan was diagnosed with breast cancer three years ago, she saw cancer treatment from a patient's point of view. Today, Jordan participates in the Patient and Family Advisor Program – a group of patients and their family members who improve the care experience by serving as a voice for patients.

Giving patients a seat at the table

Program provides forum for input from patients and their families

By Claudia Feldman

In the world of science and medicine, they were a perfect match.

Ishwaria Subbiah, M.D., was an expert on the best ways to maintain patient contact between hospital visits. But she knew she was missing an important element in her work – patient input.

MD Anderson Office Manager Toni Vasquez Jordan didn't have Subbiah's education or training. But she was a breast cancer survivor. She appreciated the importance of patient tracking, yet she had strong feelings about the many telephone surveys she was asked to complete.

Subbiah, assistant professor of Palliative, Rehabilitation and Integrative Medicine, spotted Jordan at a meeting of the Patient and Family Advisor Program. Founded in 2014, the program seeks to improve the patient experience by providing a forum for patients' and families' voices to be heard and understood.

After hearing Jordan's survey concerns, Subbiah introduced herself.

"Do you mind if I pick your brain?" she asked Jordan. "Don't sugar-coat anything."

Humanizing the patient experience

That evening they hashed out ways to improve the questionnaires. Their ongoing collaboration has resulted in better supportive care for patients, a more enlightened medical staff, and proof that a program designed to foster communication among patients, their families and staff truly works.

When Subbiah found Jordan, the palliative care doctor was working on two grant applications and the design of a clinical trial. All three projects focused on telephone and electronic



Ishwaria Subbiah, M.D., redesigned her clinical trial to include suggestions from breast cancer patient Toni Vasquez Jordan.

patient surveys and best practices for patient support between clinic visits.

That fortuitous meeting was the beginning of what has been a beautiful working relationship.

It turned out that Jordan worked just one

floor above Subbiah at MD Anderson. Jordan shared her cancer experiences over the next weeks and months, usually over coffee.

"The proximity to coffee is always helpful," Subbiah jokes.

Sometimes they shared more – photos of

Photos: Wyatt McSpadden



Toni Vasquez Jordan's cancer diagnosis affected not only her life, but also the lives of her family, including her daughters, Lindsey, left, and Gabriella.

their children, stories about their spouses, their passion to help their institution and alleviate suffering.

When Jordan found her breast lump three years ago, she told Subbiah, she tried not to jump to conclusions. Her husband, already upset about the recent loss of his mother, burst into tears. The cancer diagnosis, she realized, was not just a hand grenade tossed into her life, but also into the lives of her husband and three children.

During her treatment, Jordan tried to stay calm, appreciate the care she was getting and accept life as it came. She soon learned she had the BRCA2 gene mutation, which raises the risk of breast and ovarian cancer. She would need a hysterectomy in addition to her breast surgeries. Even worse, her two daughters were at risk for the mutation, too.

Integrating patient feedback

As Jordan talked about her recovery and the lessons learned, she remained remarkably calm – until she described those patient sur-

veys. Clearly, they tested her patience. Instead of 50 questions, there should be 10 or 12, she said. She considered the questions that required numeric answers too robotic. Finally, she said, sometimes the questions simply missed the mark. She had plenty of concerns related to cancer, and she was worried about her daughters. But too often the surveys didn't touch on the subjects she cared most about.

Subbiah took Jordan's comments to heart and redesigned the clinical trial that dealt with integrated, supportive care for patients in early-stage trials. Also, Subbiah reworked her grant proposals. The first one already has been funded by the American Cancer Society.

"It was one of those career-defining moments," Subbiah says.

The second grant – an application to the American Society of Clinical Oncology – is still pending, but if it comes through, it will be a triumphant moment for Subbiah and Jordan, too. Both their names are on the grant. Jordan boosted their chances with a letter of support, saying she was grateful the proposed study



It was one of those career-defining moments.

Ishwaria Subbiah, M.D.
Physician

incorporates the human element of telephone calls and the give and take of real conversations in addition to the surveys.

As Jordan wrote, "I think there will be many patients who look forward to these calls. And you and the medical team will find out much earlier if something is not right"

That's what it's all about, Subbiah says. Supporting patients. Identifying problems. Extending lives. ♦



Photos: F. Carter Smith

Registered nurse Liliana Larsson is part of a clinical team that follows up with patients by phone after they're discharged.

ANSWERING THE CALL

askMDAnderson ensures patients and caregivers get the help they need when they need it

By Katie Brooks

A recently discharged patient said he was feeling fine when nurse Liliana Larsson called to check on him. But as Larsson asked more questions, the patient said he was light-headed, seeing white spots and couldn't get a reading from his blood pressure monitor.

As a care manager for askMDAnderson, Larsson has the clinical training and people skills needed to ask the right questions. She's part of a new clinical team that helps patients continue to benefit from MD Anderson's care after they've gone home.

All patients discharged from the hospital, Emergency Center, and outpatient surgical and procedural areas receive automated phone calls within 24 hours. The calls start with a recorded greeting from Chief Nursing Officer

Carol Porter, D.N.P., before transitioning to a short automated survey about their care, how they're feeling and whether they have questions about discharge instructions and medications.

Twelve care managers, who are trained registered nurses and advanced practice registered nurses, monitor responses and answer patients' requests within a day. They document calls electronically so the patient's care team has the up-to-date information needed to help the patients the next time they're seen.

Is this normal?

Many patients have questions and concerns about drains, ports, medication and pain. They want to know if something's normal or a sign to seek medical attention.

Calls are documented electronically so the patient's care team has up-to-date information.

"It can be hard to remember care instructions when you have so much on your mind," Larsson says.

Care managers ask for details so they can pull out information to help patients manage their symptoms. Larsson and her teammates use resources such as patients' electronic health records and MD Anderson's online education materials to help patients be informed.



Michael Frumovitz, M.D., associate chief patient experience officer, says the goal of askMDAnderson's clinical team is to improve both patients' and providers' experiences.



Specially trained registered nurses and advanced practice registered nurses on the askMDAnderson team help answer patients' questions.

"We have an obligation to provide patients with the support they need, when they need it," says Elizabeth Garcia, associate vice president of Patient Experience. "Immediately following discharge can be a vulnerable time for patients and their family members, so we have to be proactive and responsive."

Garcia says it's important to help patients get to an emergency room quickly when needed, or if appropriate, give them additional information to help them manage their care at home.

In the case of the patient who was seeing spots and failing to get a blood pressure reading, Larsson encouraged his caregiver to seek

immediate assistance, and the patient arrived by ambulance safely at a hospital in his town. However, Larsson recounts an exchange with a caregiver who called repeatedly because he was anxious about managing his wife's care correctly.

"He gave me updates, and I told him he was doing a great job," Larsson says. "And then I encouraged him to get some sleep and take care of himself so he could continue to take great care of her."

Without Larsson's advice, both the patient and caregiver might have spent hours worrying at home or waiting to ask a question in an emergency room.

Everyone wins

Since the team started in August 2019, more than 15,000 discharged patients have received automated calls, and more than 9,000 patients have received answers to questions about their care.

Janice Finder, director of Patient Experience Clinical Services, says the high number of responses from the patients called shows they're engaged in their care. She says things can change when patients go home, so other clinicians appreciate that care managers provide real-time support.

The number of after-hours pages to providers has dropped by 59% since care managers started helping patients, says Michael Frumovitz, M.D., associate chief patient experience officer.

Joanna-Grace Manzano, M.D., assistant professor of General Internal Medicine, is grateful that care managers listen carefully to every detail.

"Their help is valuable in ensuring patients' questions are answered, and if needed, they quickly reach out to the right provider for additional guidance," says Manzano.

Research shows interventions like these elevate quality and continuity of care by reducing unnecessary Emergency Center visits and unplanned hospital readmissions, says Chief Patient Experience Officer Randal Weber, M.D. They also lower an organization's overall cost of care and protect the time and capacity of emergency rooms and hospitals to care for their most critical patients.

"This means a safer, more efficient, less expensive and more satisfying care experience for patients," Weber says.

Support after clinic hours

Any patient with a clinical question who calls MD Anderson's main line and askMDAnderson during evenings, weekends and holidays can speak with a care manager directly. Care managers document everything and only page providers if needed. During the day, patients with clinical questions are connected with their clinics.

A nurse for 15 years, with more than seven years at MD Anderson, Larsson knows how busy care team members can be. She says supporting patients and care teams makes this her most rewarding role ever. ♦

After-hours support available:

- ♦ 877-632-6789
- ♦ Monday through Friday: 5 p.m. to 11 p.m.
- ♦ Saturday, Sunday and holidays: 8 a.m. to 7 p.m.

Caregivers need care, too

By Ina Fried

Cynthia Galvez had a hard time when her husband, Robert, was diagnosed with cancer in his lung and kidney. “I just went through the motions of getting through the surgeries and the chemotherapy,” she says. “Then, I started to panic and think that I was going to be left alone, that I was going to be a widow.”

At her husband’s encouragement, she decided to seek help. A social work counselor at MD Anderson League City, where Robert was receiving chemotherapy, sent a list of caregiver support groups. Galvez chose one at MD Anderson’s Texas Medical Center Campus because it met at a convenient time.

“I don’t know what I would have done if I hadn’t had the support group. It’s just wonderful what MD Anderson does. They’re taking care of the patient, but they also want to take care of the caregiver,” she says.

Sharing experiences

MD Anderson’s Social Work department has offered the Care 4 Caregivers support group since 2007. It meets weekly at the Rotary House, a Marriott hotel attached to MD Anderson.

“People take care of each other,” says Tiffany Meyer, one of five social work counselors who takes turns facilitating the group. “Caregivers often come in and say, ‘I don’t really like talking about my stuff, but I didn’t realize how much I needed to talk,’ or ‘I didn’t realize that it’s OK for me to share some of this stuff with other people. I love how it decreases the isolation that a lot of caregivers feel.’”

While some caregivers – especially those from out of town – can’t attend support group meetings on a regular basis, others return again and again. Galvez has attended about 10 times.

“Those meetings are very comforting – to be able to share your experience and hear other people’s experiences,” Galvez says. “I was able to deal with my feelings and realize that everything that I was feeling was pretty normal.”

A family illness

Fear, anxiety, anger, frustration and guilt are all common feelings among caregivers. Educating and supporting caregivers to understand and deal with these feelings are goals of a support group called Cancer is a Family



Tiffany Meyer is one of five social work counselors who take turns facilitating the Care 4 Caregivers support group.



Carmella Wygant counsels cancer patients’ family members in the Cancer is a Family Illness support group.

Illness, offered by the Psychiatry department since February 2018.

“One person in the family is diagnosed, but the whole family feels this disease,” says Carmella Wygant, a clinical psychotherapist. “Any change will bring about loss and grief, and one of the most common reactions to grief is anger.”

Wygant describes a typical caregiver: “They’re no longer able to go to work, their income is compromised, they are completely out of their element, and they are at the whim of the different appointments that are necessary, so they are very aware that they have no control over the situation. A lot of the reason there’s anger is that the old strategies that worked in a life that was cancer-free don’t work now, when there is cancer and so much uncertainty.”

Being present

Many caregivers also experience feelings of powerlessness and vulnerability, Wygant says. They are trying to gain control over things that they cannot control, and they feel guilty, frequently revealing self-blame when they can’t do more for their loved ones.

“Most caregivers don’t like to ask for help because they’re the ones taking care of everybody else,” Meyer says. “We talk in the support group about getting comfortable with asking

for help. Giving themselves permission to ask for help can be really important.”

Both Meyer and Wygant encourage caregivers to take care of themselves, so they can continue to support their loved ones.

“That is critical for every caregiver to know – just being present makes a difference,” Wygant says.

A little extra

Wygant has requested and received grants from MD Anderson’s Volunteer Endowment for Patient Support to provide light refreshments for the Cancer is a Family Illness group. Refreshments may vary from cheese or fruit to decorative cupcakes or chocolate-covered strawberries.

“It seems so small, but it means so much to the caregivers,” she says.

Most important, the groups provide a safe place for caregivers to talk and share. Caregivers consistently say they are revealing feelings and experiences in the group they have never said out loud before.

“I think everybody comes out feeling better, a little more optimistic,” says Galvez. “It’s like, I’m going to be able to get through this.” ♦

Robert and Cynthia Galvez are traveling the globe and enjoying life after Robert’s cancer diagnosis.



Librarian Adela Justice helps Barbara Hsu and her husband, Michael, download mobile apps.

Helping older patients bridge **THE DIGITAL DIVIDE**

By Ronda Wendler

When Barbara Hsu was born in 1939, no one had a television in their home, let alone a computer or smartphone.

“Times were simpler then,” says Hsu. “Sometimes I wish they still were, but it’s 2020 and there’s no turning back.”

Today, she’s using technology to manage her health care online. She’s mastered MyChart – MD Anderson’s patient portal – and uses it to check her medical results, communicate with her health care team and schedule appointments online.

Empowered by personalized tech help

But the 80-year-old leukemia survivor wasn’t always so digitally savvy.

“At first I felt intimidated,” she recalls. “Then I discovered Tech Tuesdays, and everything changed.”

Tech Tuesdays are free technology help sessions held in The Learning Center, MD Anderson’s patient education library, the last Tuesday of each month. Patients, their family members and caregivers can drop by for personalized help with electronic devices, social media, mobile apps, MyChart and more.

Adela Justice, a senior librarian at the center, says those who seek help are typically older.

“The average age of cancer patients in the United States

is 66, which means they weren’t raised in the age of digital technology. Yet as patients, they’re expected to use it,” Justice notes. “Furthermore, they’re battling cancer. It can all be very overwhelming. We’re here to help.”

With no judgement and infinite patience, Justice and her fellow staff members sit side-by-side with patients and their loved ones, teaching them how to download and use an app, save documents to iCloud, find a book on a Kindle, customize computer or smartphone settings, set up and use new devices, create social media accounts on platforms like Facebook or Instagram, install updates, and much, much more.

“Most people learn better with a hands-on approach,” Justice says. “We show them how. Then we watch as they practice.”

The joy that accompanies that “aha” moment when a patient grasps how to execute a digital task is enormously rewarding, she says.

“Now they can do it themselves. They feel confident. They no longer have to ask their grandchildren for help.”

Justice offers these words of encouragement to help senior citizens overcome techno-stress, her phrase for fear of technology: “You can do this. It’s basically ‘push this button, type inside this box.’ It’s not an inborn talent. It’s an acquired skill anyone can learn.” ♦

‘We should have come to MD Anderson first’

By Virgil Woods

I am a very skeptical person, so when I hear things described as “the best,” I don’t really believe it. But MD Anderson has been called the best cancer hospital in the world for years. And now, I know it’s true.

My wife, Tralisa, was diagnosed with ovarian cancer in late 2017, at a hospital near our home in Dallas. We came to MD Anderson for a second opinion.

It was there that we learned she’d been misdiagnosed. My wife actually had uterine cancer. If she’d gone much longer without the correct diagnosis, she probably wouldn’t be here today.

Initial misdiagnosis

We learned something was wrong in early December. While I was taking our son to diving lessons, Tralisa called and said she had a pain in her chest. I thought it was something she ate or maybe a little gas. But she was hurting pretty bad, so her mother took her to the emergency room.

A little later, I got another call: Tralisa needed me at the hospital. When I got there, the doctors said my wife had a huge mass in her chest and abdomen. They didn’t know what it was, but it had to be removed.

We agreed to the surgery. The surgeons removed the mass and one of her ovaries. Tralisa was still recovering in the hospital when the pathology report came back.

The oncologist said Tralisa had ovarian cancer. And while the diseased ovary had been removed, he wasn’t sure if the cancer had spread to any nearby lymph nodes. He recommended chemotherapy and a complete hysterectomy.

An instant bond

Something about that didn’t sit right with me. After I got Tralisa home, I started doing research online. I kept running across references to MD Anderson, so I talked to my wife about getting a second opinion there. She wasn’t sure she wanted to, both because it was five hours away and because she was eager to get on with her cancer treatment and be done with it.



After Tralisa Woods (left) was diagnosed with uterine cancer, her husband, Virgil, encouraged her to visit MD Anderson. Here, she learned she had ovarian cancer.

But I felt this was very important and kept pushing. She finally agreed.

We drove to Houston a few days later. My first thought when we got to MD Anderson was, “We should’ve come here first.”

My wife and Michaela Onstad, M.D., had an instant bond. Tralisa’s face glowed when they interacted. I was not going to break that up. If she felt more comfortable at MD Anderson, that’s where she needed to be.

A second chance

After additional testing showed that Tralisa actually had uterine cancer, she had a hysterectomy at MD Anderson on Feb. 6, 2018, followed by radiation therapy and chemotherapy. Today, she’s cancer-free and doing great.

That’s why we still travel 500 miles round trip for follow-up appointments. The level of care at MD Anderson is simply amazing. And I put a lot of faith in Dr. Onstad. Not just because she cured my wife’s cancer, but because she identified the real problem and gave Tralisa a second chance at life.



If she felt more comfortable at MD Anderson, that’s where she needed to be.

Virgil Woods
Caregiver

We were shocked when MD Anderson changed Tralisa’s diagnosis to uterine cancer. At the time, a part of me thought, “OK. Maybe the first hospital just missed it. They just slipped.” But you can’t slip with someone’s life. Dr. Onstad and MD Anderson went that extra step. And that gave my son his mom back and me my wife back.

Read more stories like the Woods’ on *Cancerwise*, MD Anderson’s blog for patients and caregivers: mdanderson.org/cancerwise.



MD Anderson retiree Rashida Jinnah decided to volunteer at MD Anderson in Sugar Land, just minutes from her home.

Expanding their horizons

Volunteers support patients and staff at Houston-area locations

By Kelley Murfin

Rashida Jinnah knows MD Anderson inside and out. After all, she worked here for 23 years before retiring in 2008.

“In my role as a nutrition support specialist, I interacted with patients every day. The connection was so rewarding. I didn’t want to give that up.”

It turns out she didn’t have to. Jinnah became a volunteer at MD Anderson in Sugar Land, just a few minutes from her home.

“The number of patients in Sugar Land is small, compared to MD Anderson’s Texas Medical Center Campus. Most come back every week,” says Jinnah. “This gives volunteers more time to spend with patients and staff. You develop comfortable and rewarding relationships with them.”

MD Anderson’s Texas Medical Center Campus has more than 1,000 volunteers. The cancer center’s four suburban locations have 26 altogether. This small but dedicated crew serves MD Anderson’s locations in Sugar Land, The Woodlands,

West Houston and League City. They’re a diverse group that includes cancer caregivers, cancer survivors, military veterans, college students and retirees – each with their own unique reason for volunteering.

Larisha Sellers became a volunteer after her mother and father died of cancer.

“Losing my parents motivated me to give back to patients who are fighting cancer today,” says Sellers, a military veteran who volunteers at MD Anderson League City.

Volunteers typically work one four-hour shift each week. They talk with patients and caregivers, serve snacks and beverages, and pass out warm blankets.

Volunteers also provide patients with information about support services, including social work, dietary consulting, educational literature and groups, and resources such as myCancerConnection – MD Anderson’s cancer support community that offers free, one-on-one support by matching cancer patients with trained survivor and caregiver volunteers.



Photos: Nick de la Torre

Larisha Sellers was inspired to volunteer at MD Anderson League City after both her parents died of cancer.

“Volunteers are the connection between each patient at the Houston-area locations and the support services located on the Texas Medical Center Campus,” says Mary Jackson, a director in MD Anderson’s Volunteer Services and Merchandising department. “Our volunteer program is a consistent strength of our multidisciplinary approach to patient care.”

Because they have close and candid interactions with patients, volunteers often are called upon to represent the patients’ perspective. For example, when MD Anderson The Woodlands was transitioning to its new building, which opened last fall, a volunteer served on the planning committee and discussed patients’ needs and preferences for the new location.

“Patients and volunteers alike report that our Houston-area locations feel like relaxed, neighborly spaces,” Jackson says. “This further promotes the relationship-building that is so important to patients and volunteers alike.” ♦



Our volunteer program is a consistent strength of our multidisciplinary approach to patient care.

Mary Jackson
Director

Volunteer Services & Merchandising

Photo: Wyatt McSpadden



Maher Karam-Hage, M.D., medical director of the Tobacco Treatment Program, video conferences with patient Chris Byrd, who is at home in El Paso.

Going the distance to help smokers quit

By Meagan Raeke

Smokers enrolled in MD Anderson’s Tobacco Treatment Program will have a better chance of quitting than those participating in other programs.

That’s the verdict of a recent study that revealed almost half of the more than 3,000 people who entered MD Anderson’s Tobacco Treatment Program have quit tobacco successfully. Other smoking cessation programs, by comparison, only boast success rates of around 20%.

“Patients deserve the absolute best opportunity we can give them to quit smoking,” says Paul Cinciripini, Ph.D., chair of Behavioral Science and director of the program. “Based on our findings, we recommend offering cancer patients who smoke a comprehensive smoking cessation program to accompany their other treatment.”

The secret of the MD Anderson program’s success, he says, lies in its approach, which uses a combination of nicotine-replacement therapy, medication and eight to 12 weeks of behavioral counseling to help smokers kick the habit. The comprehensive program also offers participants treatment for underlying psychiatric conditions, such as depression, anxiety and insomnia, which can make it harder to quit.

Immediate benefits

The payoff for cancer patients who quit smoking at the time of diagnosis is indisputable, Cinciripini says: Their chances of survival immediately improve by 30% to 40%. Quitting can also make their treatments more effective and reduce their chances of relapsing or developing a secondary cancer.

“Quitting smoking doesn’t just add years, it adds quality years to your life,” notes Cinciripini. “It’s the most cost-effective cancer prevention strategy we have.”

Sometimes, patients mistakenly assume they can’t quit, because they’ve already tried several times on their own without success.

“We let them know that most people who quit make numerous attempts before succeeding,” says Diane Beneventi, Ph.D., assistant professor of Behavioral Science and the program’s clinical director. “And we’re here to make it easier.”

Going mobile

Last year, the Tobacco Treatment Program began offering counseling sessions through live video conferencing to make these meetings more convenient. The sessions are available through a mobile app that patients can access from anywhere. The video conferencing option has already proven popular among patients.

Photo: Adolfo Chavez III



Jennifer Cofer directs EndTobacco®, which aims to reduce smoking and increase smoking cessation counseling.



Many of the people we’re training will become the go-to people for tobacco treatment at their hospitals or clinics.

Paul Cinciripini, Ph.D.
Researcher

“It grew exponentially,” says Maher Karam-Hage, M.D., professor of Behavioral Science and medical director of the Tobacco Treatment Program. “We started video conferencing with two or three evaluations the first month and now a quarter of our patients contact us from their homes. Preliminary data indicates that patients treated remotely are able to quit at similar rates to those coming in for treatment in person.”

The team expects the number of patients using the remote video option to grow over the next year. They’re also planning to open a mobile smoking cessation clinical trial this year for current smokers living anywhere in Texas.

Branching out

To help even more smokers kick the habit, experts at MD Anderson have begun teaching other health care providers how to launch the Tobacco Treatment Program in their own clinics, hospitals and doctors’ offices. The initiative, named the Certified Tobacco Treatment Training Program, is a joint effort between EndTobacco® and the Behavioral Science department. It’s one of only 22 courses in the U.S. – and the only one in Texas – accredited by the Council for Tobacco

Treatment Training Programs to deliver tobacco treatment specialist training and certification.

“Our team has world-renowned tobacco treatment experts, and now they’re spreading their version of treating tobacco addiction beyond our walls,” says Jennifer Cofer, director of EndTobacco, an initiative of the cancer prevention and control platform of MD Anderson’s Moon Shots Program®.

Since the training program began, 455 people have completed the course, and 92% have become certified tobacco treatment specialists. Participants include psychologists, psychiatrists, case managers, social work counselors, respiratory therapists, registered nurses and community health educators. They work in settings ranging from community-based health centers to large health care systems.

“Many of the people we’re training will become the go-to people for tobacco treatment at their hospitals or clinics,” Cinciripini says. “Physicians want to help their patients stop smoking, but they don’t necessarily have the time or training to do that. Having someone in their immediate practice who can deliver that service is a win-win.”

The four-day course is offered three times a year at MD Anderson. It’s also hosted at other locations in the U.S.

“I learned new and alternative ways to approach tobacco cessation treatment,” says Cassie Richardson, a clinical pharmacy specialist who attended the first training. “Now I’m putting my knowledge to use by helping smokers become ex-smokers.”

After completing the training and obtaining certification, specialists can earn a national credential from the Association for Addiction Professionals by acquiring 240 hours of clinical or community practice. Many also take advantage of MD Anderson’s free, weekly tele-mentoring program, Project TEACH, where they can discuss difficult cases and continue to learn from each other and program leaders, while earning continuing education credits. ♦

Narrowing the gap

Program trains students from Puerto Rico to become physician-scientists

By Anissa Anderson Orr

Growing up in Puerto Rico, Carolina Garcia Garcia always knew she would be a doctor. But while learning and making discoveries in the lab in college at the University of Puerto Rico, Garcia Garcia felt the pull of scientific research. Then she encountered MD Anderson representatives who were recruiting students for the institution's M.D./Ph.D. training program, which opened her eyes to another option: She could become a physician-scientist.

"I didn't know you could actually do both," Garcia Garcia says. "The idea of earning both an M.D. and a Ph.D. was so appealing to me. It's the best of both worlds. You can see patients; you can understand what they need and how medicine can advance."

Training the best and brightest

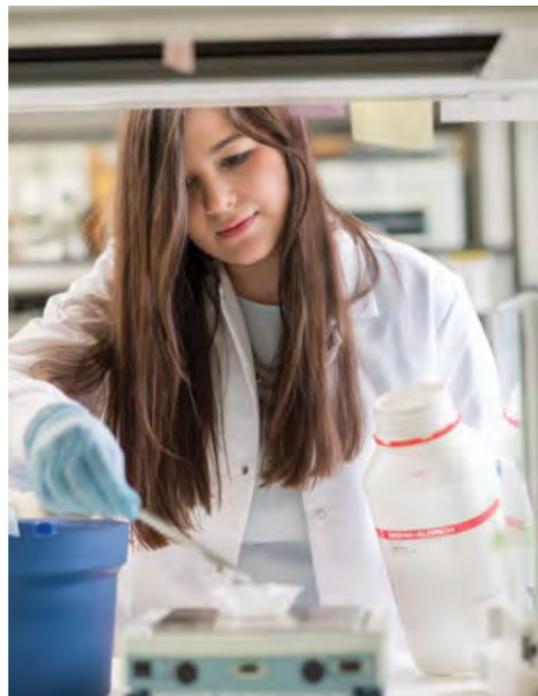
Garcia Garcia is one of a select group of Puerto Rican students studying to become physician-scientists and exploring biomedical research as it relates to cancer at MD Anderson.

They're here thanks to the M.D./Ph.D. program that's part of the Partnership for Excellence in Cancer Research – a collaboration of MD Anderson, the MD Anderson Cancer Center UTHealth Graduate School of Biomedical Sciences and the University of Puerto Rico School of Medicine. The program seeks to eliminate cancer health disparities in underserved populations in Puerto Rico and Texas through research, education and training.

Last October, the Partnership received \$13 million in renewed funding from the National Institutes of Health to support the initiative's collaborative research projects, community outreach and joint education programming.

The idea is to find and train the best and brightest students from Puerto Rico, so that they can return and improve cancer care and research.

"There's an extreme shortage of Hispanic physician-scientists," says Elizabeth Travis, Ph.D., associate vice president for Women and Minority Faculty Inclusion at MD Anderson. She's been with the program since its start in 2008, and is a lead researcher on the grant. "We thought this was an opportunity

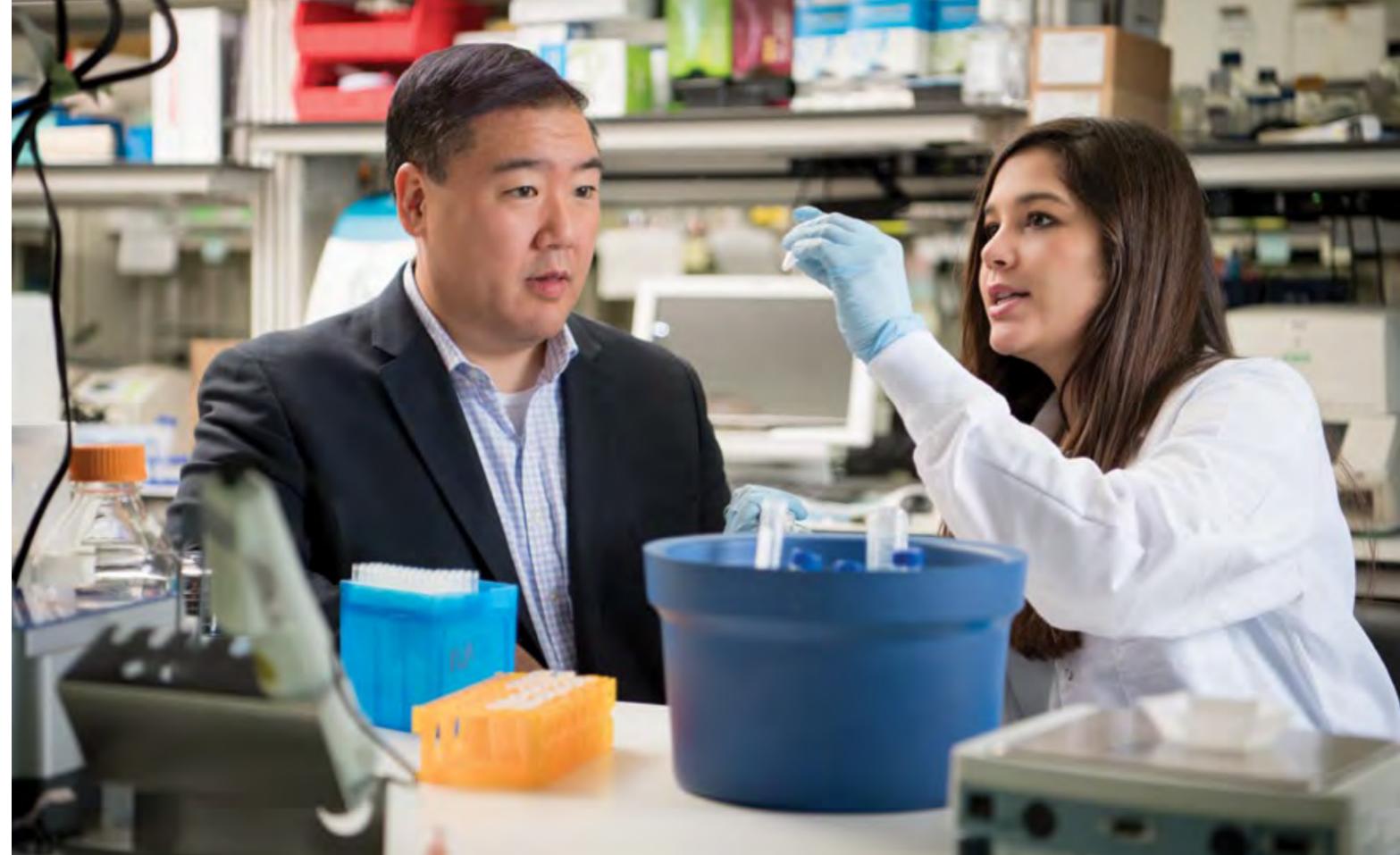


Carolina Garcia Garcia is studying to be a physician-scientist through a unique partnership between MD Anderson and the University of Puerto Rico.

to build that pipeline with M.D./Ph.D. students from Puerto Rico," Travis says. "It's been a resounding success."

In 2018, the program received accreditation as a Medical Scientist Training Program, which only the top M.D./Ph.D. programs in the United States have achieved. And the eight graduates of the dual-degree program have earned prestigious honors, residencies and fellowships at other top medical institutions. Garcia Garcia recently received the Marie Curie Award from the Radiation Research Society, given to the trainee showing the highest potential for a successful career in radiation research.

Photos: Thomas Campbell



Garcia Garcia works with radiation oncologist Cullen Taniguchi, M.D., Ph.D., exploring ways to reduce side effects of radiation.

Competitive program

Only two or three students are accepted into the program each year. They spend three years in medical school in Puerto Rico, four years or more doing research to qualify for a Ph.D. at MD Anderson UTHealth Graduate School, and then return to Puerto Rico for their final year of medical school. While at MD Anderson, students have firsthand experiences and mentorship in basic, clinical or translational research alongside world-renowned faculty.

"They start doing laboratory research right away to pick which lab that they would like to join for their thesis research," says Dean Michelle Barton, Ph.D. Barton leads a grant that funds a summer program that is the gateway to the dual-degree program.

Garcia Garcia is in the third year of her Ph.D. studies. Like many students in the program, she came to MD Anderson through the Partnership's Summer Scholars Program, which hosts up to 20 students a year. She says working in the lab of an MD Anderson pathologist awakened her to opportunities she wouldn't have had in Puerto Rico.

"Before that, I was considering just doing medical school. He introduced me to some students in the program and to other physician-scientists. If it wasn't for him, I wouldn't even have considered doing an M.D./Ph.D."

Today, Garcia Garcia is working in the lab of radiation oncologist Cullen Taniguchi, M.D., Ph.D., exploring ways to reduce nausea and other toxic side effects of radiation.

"I'm trying to trick the intestines into thinking they're low in oxygen, and in that way we can protect them from high doses of radiation," Garcia Garcia says, adding that the approach holds promise for patients with pancreatic cancer.

"You can't maximize the effect of cancer therapies because of the toxicities they have on the intestines," she says. "We could cure more patients if we could optimize chemotherapy and radiation."

Moving forward

Garcia Garcia has one more year of medical school in Puerto Rico, then several more years of training before she becomes a full-fledged physician-scientist. Her goal is to become a radiation oncologist and have her own laboratory in Puerto Rico, dedicated to radiation oncology research.

She knows there are obstacles to achieving this dream, though. Puerto Rico is in the midst of a financial crisis and still recovering from Hurricane Maria. And many of the best training opportunities are stateside.

"But with the grant money, the hope is to shore up health, medical and cancer facilities back in Puerto Rico to allow students to start up their own labs," Barton says.

In the meantime, Garcia Garcia continues on her journey to becoming a physician-scientist. "When I think back on all the opportunities I've had at MD Anderson, I'm very grateful; I definitely would not have had them anywhere else. It's been an amazing experience." ♦



Van Morris, M.D., says Diane Bodurka, M.D., has been instrumental in guiding his career from his earliest days as a medical student.

Van Morris benefited from the guidance of others. Now he does the mentoring.

By Jill Russell, Ph.D.

Seasoned mentors who offer advice and career guidance to their newer colleagues come in all forms. Just ask Van Morris, M.D.

“Over the years, I’ve been fortunate to benefit from knowledgeable and caring individuals who gave me professional and personal support,” says Morris, assistant professor of Gastrointestinal Medical Oncology. “They showed an interest in my success and helped me be the best I could be.”

Morris first came to MD Anderson through a summer training program in 2005, after completing his first year of medical school at the University of Tennessee Health Sciences Center in Memphis, his hometown. He worked in Gynecologic Oncology with Diane Bodurka, M.D., Pam Soliman, M.D., and Kathleen Schmeler, M.D., who inspired him and taught him the importance of mentorship.

“They were instrumental in guiding my career,” he recalls. “I was the first person in my family to pursue a medical degree, so everything was new to me.”

That summer, Bodurka, who is now a professor and chief education and training

officer at MD Anderson, encouraged Morris to apply for an MD Anderson fellowship once he graduated from residency.

“I saw that Van had an interest in oncology,” she recalls. “As a medical student, he was very diligent and dedicated to his work. All the ingredients for success were there.”

From trainee to colleague

Morris took Bodurka’s advice. After medical school and a residency at Duke University, he returned to MD Anderson as a Hematology/Oncology fellow. When the fellowship was over, he participated in the Advanced Scholar Program through the Cancer Medicine division. The program provides an additional year to help participants build upon the research they started as fellows.

During this time, Morris worked on practice-changing research alongside his faculty mentors.

“This is what drew me to oncology in the first place,” he recalls. “The field of oncology is moving so quickly, and the opportunity to perform cutting-edge research that ultimately changes peoples’ lives is very fulfilling.”

Morris worked with Scott Kopetz, M.D., Ph.D., professor of Gastrointestinal Medical

Oncology, to identify new targeted therapies for patients with metastatic colorectal cancer. He also worked with James Allison, Ph.D., who won the 2018 Nobel Prize in Physiology or Medicine, on the first clinical trial to use single-agent nivolumab – an immunotherapy drug – to treat advanced anal cancer.

“During that time, I learned about writing and developing clinical trials,” says Morris, who became an assistant professor in 2015.

Bodurka says watching Morris’ growth over the past 15 years has been particularly rewarding.

“I was able to mentor a medical student, watch him grow into a very successful clinician and researcher, and now work with an esteemed colleague,” she says.

Paying it forward

Morris is now paying forward the gift of mentorship. He recently mentored Katherine Clifton, M.D., his first fellow from the Hematology/Oncology Fellowship program. She’s now an assistant professor specializing in breast cancer at Washington University School of Medicine in St. Louis.

“Van was an amazing mentor,” Clifton says. “He met with me weekly to discuss research, job interviewing and career development. He puts his heart and soul into everything he does – patient care, research and mentorship.” ♦

Collaborative approach yields better prostate cancer care

By Lany Kimmons

Bringing together all of the specialists patients need to see under one roof so they can receive integrated, collaborative treatment is the hallmark of multidisciplinary care. So, what happens when men receive prostate cancer care from multidisciplinary care clinics like the one at MD Anderson?

Findings from a new MD Anderson study show that these patients are more likely to receive treatments that adhere to the national standard of care. In simple terms, that means “best practices for treating the disease.”

Prostate cancer patients who receive care at multidisciplinary prostate clinics also are more likely to participate in discussions with their doctors and to have a say in their treatment options.

The study – the largest of its kind – compared almost 4,500 prostate cancer patients who received care at MD Anderson’s multidisciplinary prostate cancer clinic to a similar-sized group listed in the Surveillance, Epidemiology, and End Results (SEER) national cancer database. Patients in the SEER database were not necessarily treated in a multidisciplinary clinic. “We were interested in querying the results of our multidisciplinary clinic experience, as our clinic has been open since 2004,” says Chad Tang, M.D., assistant professor of Radiation Oncology and leader of the study.

A balanced approach to treatment

More than 170,000 men are diagnosed with prostate cancer each year, according to the American Cancer Society. It’s the most common cancer in men, outside of skin cancer. A variety of treatment options are available, including surgery, radiation therapy, hormone therapy, chemotherapy and active surveillance, in which a relatively slow-growing cancer may be watched rather than treated.

“Some men,” Tang says, “are never informed about all the options available to them, and some doctors tend to recommend the treatment that they can deliver. But in a multidisciplinary clinic, patients quickly receive a balanced view of treatment options without needing to schedule multiple appointments with multiple doctors.”



Chad Tang, M.D., led a study that found prostate cancer patients treated at multidisciplinary clinics were more likely to receive treatment choices and care supported by evidence-based guidelines.

Treatment decisions are highly personalized, Tang says, and depend on such factors as the patient’s age, how advanced his disease is, and whether he’s willing to run the risk of urinary incontinence or sexual dysfunction, which can occur after some treatments.

For patients whose cancer is at low risk of spreading, active surveillance and more aggressive treatments have both been shown to control the cancer, but they have very different quality of life measures. For example, some people don’t care about the risk of sexual dysfunction and may opt for surgery.

“Either way, it’s the patient’s choice,” Tang says. “If he’s a perfect candidate for active surveillance but really wants his cancer treated, that’s his option.”

At MD Anderson’s Multidisciplinary Prostate Cancer Clinic, health care providers work together using the same processes, workflows, treatment philosophy and standardized guidelines for every patient. Based on this Houston clinic, MD Anderson has also opened multidisciplinary prostate cancer clinics in MD Anderson Cancer Network®, a group of community hospitals and health systems nationwide that collaborate with MD Anderson



In a multidisciplinary clinic, patients quickly receive a balanced view of treatment options.

Chad Tang, M.D.
Physician

to deliver higher quality and advanced care to patients in their communities.

“It’s important to offer patients the full spectrum of care, a well-balanced approach, assistance with decision-making, and the resulting effects connected with a patient-centric, multidisciplinary style,” says Deborah Kuban, M.D., vice president of Cancer Network clinical operations. “These findings are important, and hopefully can encourage the development of more multidisciplinary clinics.” ♦

Photos: F. Carter-Smith



Attending the Breast Center gala are, from left, Breast Center team members Gabriel Hortobagyi, M.D.; Powel Brown, M.D., Ph.D.; Kelly Hunt, M.D.; Abenaa Brewster, M.D.; Debu Tripathy, M.D.; and Kimberly Koenig, M.D.

Breast Center celebrates 25 years of Making Cancer History®

MD Anderson's Nellie B. Connally Breast Center, named for a breast cancer advocate and former first lady of Texas, celebrated its 25th anniversary with a Dec. 17 gala.

More than 40,000 patients are treated at the center each year, making it one of the largest in the country.

The multidisciplinary approach to cancer care that is now the hallmark of MD Anderson was spearheaded by the Breast Center, where medical oncologists, surgeons, radiation oncologists, pathologists, geneticists, registered nurses and other health care providers meet regularly to review each patient's status.

"Individual health care professionals bring their skills to our multidisciplinary teams, where they work together to develop treatment plans that address the unique nature of each breast cancer patient," says Debu Tripathy, M.D., professor and chair of Breast Medical Oncology.

The center is renowned for its long history of offering innovative therapies, many which today have become standard treatments.

"We've developed a number of new treatments that were not even considered possible 25 years ago," says Gabriel Hortobagyi, M.D., program director of Breast Medical Oncology.

Advances like these, he says, mean that more and more women are surviving breast cancer each year. ♦



Richard Theriault, M.D., shares milestones achieved by the center.



MD Anderson employees Daron Gilmore and Christina Boulton perform with the institution's band, the Checkmates.



Fiscal Year 2019

Institutional leadership,
financial and statistical data
Sept. 1, 2018 - Aug. 31, 2019

Photo: Adolfo Chavez III



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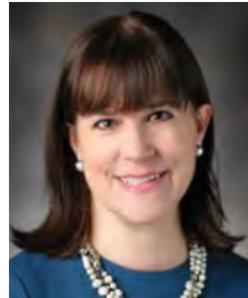
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*Current as of Dec. 31, 2019

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The MD Anderson Cancer Center Board of Visitors is an appointed board of people committed to helping MD Anderson achieve its mission of eliminating cancer. Board programs emphasize private fund development, public relations and outreach on behalf of the institution.



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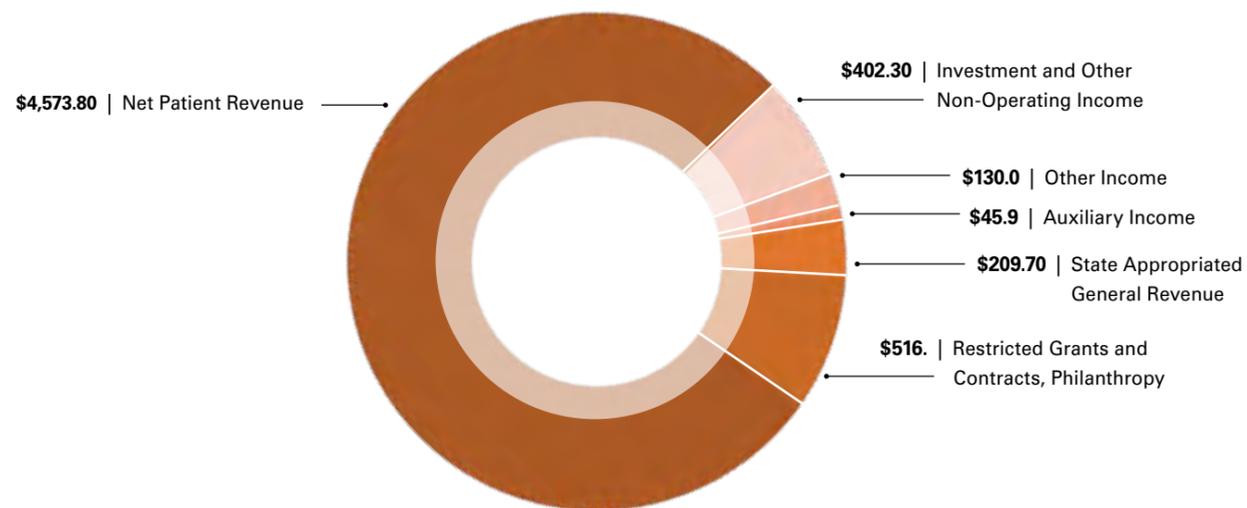
*Current as of Dec. 31, 2019

Fiscal Year 2019

Sources of revenue

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Patient Revenue					
Gross patient revenue (Includes inpatient, outpatient and professional services)	\$7,567,179,285	\$7,571,426,899	\$8,214,974,402	\$8,926,301,959	\$10,082,677,115
Deductions from gross patient revenue ¹	3,935,319,324	4,044,324,615	4,460,335,552	4,842,147,440	5,508,836,828
Net patient revenue	\$3,631,859,960	\$3,527,102,284	\$3,754,638,850	\$4,084,154,519	\$4,573,840,288
Other Revenue					
Restricted grants and contracts, philanthropy	\$402,702,183	\$466,883,217	\$491,038,777	498,042,406	516,682,091
State-appropriated general revenue	187,350,746	201,848,484	203,439,111	210,130,778	209,733,872
Auxiliary income ²	44,808,473	42,462,462	44,137,660	44,292,397	45,855,795
Other income ³	107,422,200	112,515,085	113,187,342	120,376,674	130,000,233
Investment and other non-operating income	121,624,475	129,632,830	392,901,020	268,224,779	402,329,745
TOTAL REVENUE	\$4,495,768,037	\$4,480,444,361	\$4,999,342,760	\$5,225,221,554	\$5,878,442,025

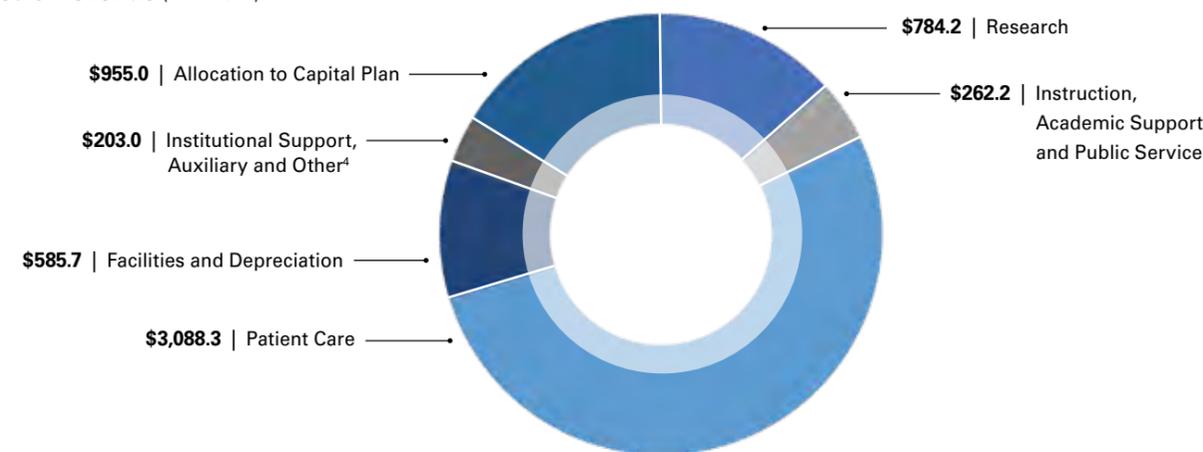
Sources of revenue (in millions)



Uses of revenue

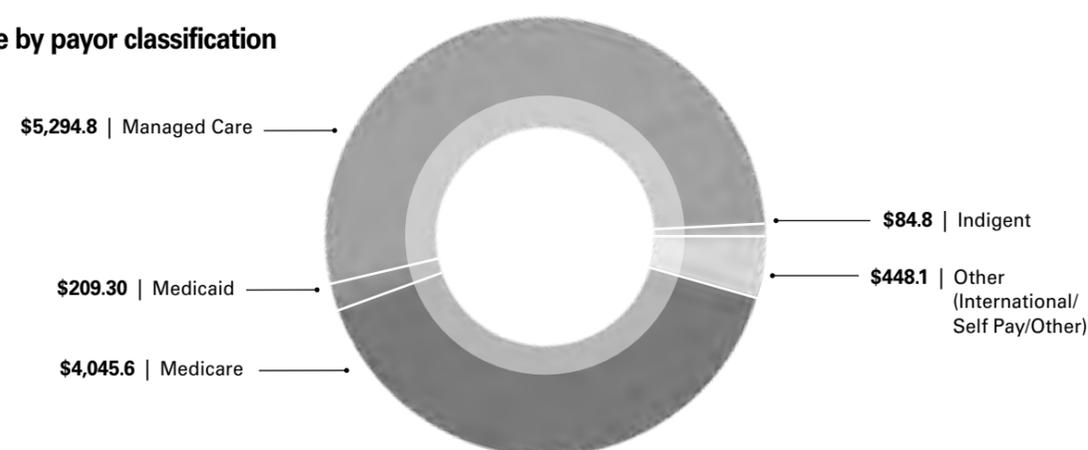
	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Research	\$668,243,371	\$687,940,063	\$745,481,237	\$750,400,862	\$784,212,601
Instruction, academic support and public service	225,871,577	234,488,229	248,155,843	237,216,678	262,166,575
Patient care	2,369,972,993	2,642,145,329	2,585,835,231	2,723,124,887	3,088,325,453
Facilities and depreciation	508,973,014	550,277,895	563,364,679	572,430,565	585,654,058
Institutional support, auxiliary and other ⁴	155,828,553	158,060,132	157,051,220	155,161,923	203,016,040
Allocation to capital plan (For future projects to replace and improve facilities and technology)	566,878,529	207,532,714	699,454,551	786,886,639	955,067,297
TOTAL EXPENSES	\$4,495,768,037	\$4,480,444,361	\$4,999,342,760	\$5,225,221,554	\$5,878,442,025

Uses of revenue (in millions)



Gross revenue by payor classification

(in millions)



MD Anderson provided more than \$238.6 million in uncompensated care to Texans with cancer in FY19.*

*This figure includes unreimbursed costs of care for patients who either have no insurance or are underinsured, or whose care was not fully covered by government-sponsored health programs.

⁴ Includes support for parking, food and gift shop services, as well as general institutional support (e.g. information technology, human resources, administration, development activities, etc.).

¹ Amounts discounted from established rates as a result of agreements with third-party payors, including Medicare, Medicaid and insurance companies. Also includes deductions associated with indigent care and bad debt.

² Funds received from parking fees, valet services, dining facilities, hotel charges, gift shop sales and vending-machine sales.

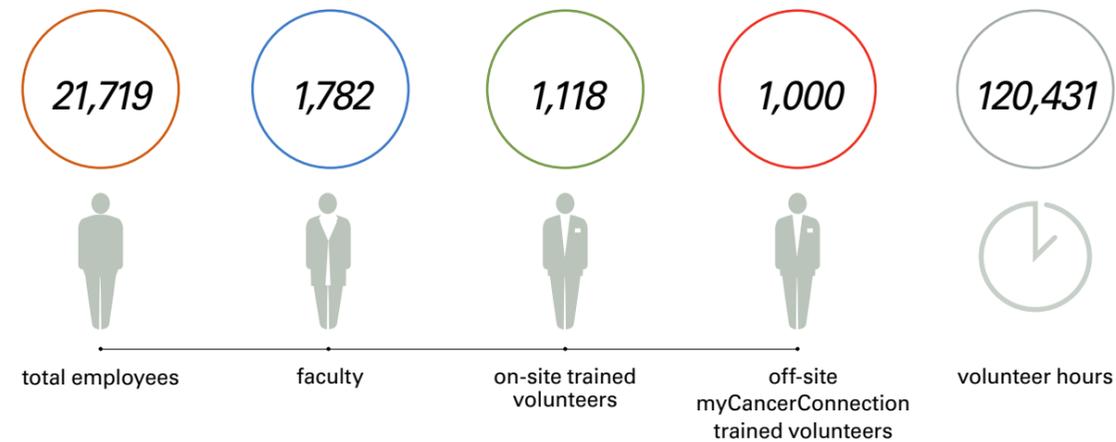
³ Includes tuition and student fees, Children's Art Project sales, management fees and other sources.

Sources of research expenditures

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
External funding for research					
Federal grants, contracts	\$161,170,908	\$155,043,499	\$167,061,117	\$173,899,855	\$179,497,413
Private industry grants, contracts	81,076,353	89,454,454	127,758,909	141,656,018	156,234,119
Philanthropy, foundations	172,412,727	166,374,314	191,181,214	171,352,085	164,633,426
Total external funding	\$414,659,988	\$410,872,268	\$486,001,240	\$486,907,958	\$500,364,957
State funding allocated for research					
State-appropriated general revenue	\$13,658,113	\$14,991,640	\$15,021,736	\$14,720,920	\$14,686,051
Tobacco settlement receipts	10,227,690	12,188,092	13,143,222	20,560,115	15,295,590
CPRIT	32,049,453	40,227,040	53,292,732	48,999,398	44,155,637
Total state funding	\$55,935,256	\$67,406,772	\$81,457,690	\$84,280,433	\$74,137,278
Internal funding allocated for research					
Hospital operating margins	198,607,568	193,071,901	187,850,299	198,667,225	205,863,625
Institutional grants*	111,374,655	115,938,206	88,864,952	93,026,768	121,893,215
Total internal funding	\$309,982,223	\$309,010,107	\$276,715,251	\$291,693,993	\$327,756,840
TOTAL RESEARCH EXPENDITURES	\$780,577,467	\$787,289,147	\$844,174,182	\$862,882,384	\$902,259,075

*Philanthropic donations to the institution internally designated to support research and PRS funds internally allocated to support research activities.

Workforce



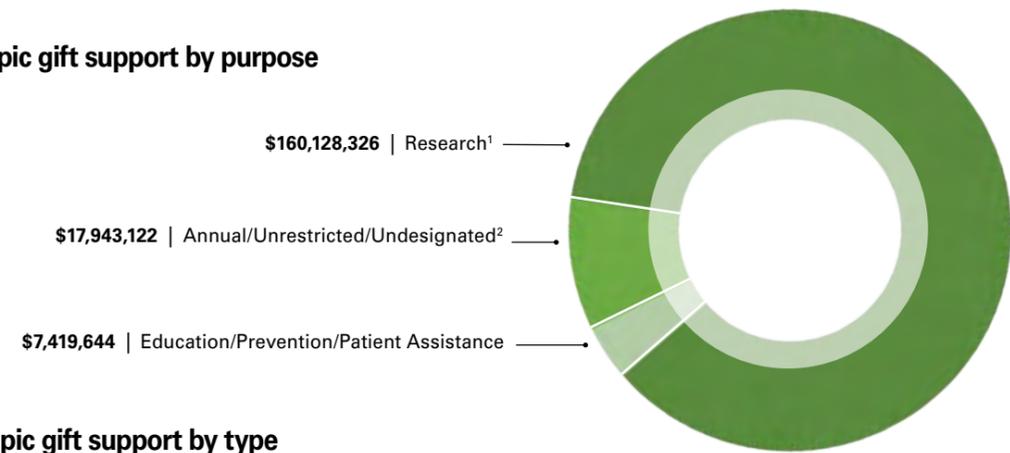
Clinical profile

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Hospital admissions	28,167	27,391	28,793	29,118	30,339
Patient days	202,483	198,080	202,411	207,071	218,217
Average daily census	574	561	577	587	618
Average length of stay	7.2	7.2	7.0	7.1	7.2
Average number of inpatient beds	665	661	681	673	669
Outpatient clinic visits, treatments, procedures	1,440,684	1,404,329	1,441,403	1,458,076	1,547,197
Pathology/laboratory medicine procedures	12,334,917	12,073,679	12,700,333	13,280,436	13,262,586
Diagnostic imaging procedures	530,590	524,044	574,018	611,190	615,053
Surgery hours	69,987	67,936	70,460	71,462	71,701
Total active clinical protocols	1,197	1,202	1,255	1,252	1,364

Education profile

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Clinical residents, fellows	1,507	1,693	1,693	1,775	1,968
Research trainees	1,890	1,847	1,779	1,791	1,600
Observers, visitors, special programs	752	838	906	831	876
Nursing trainees	1,352	1,499	1,506	1,440	1,150
Student programs participants	817	810	806	888	900
School of Health Professions students	303	317	339	357	393
TOTAL TRAINEES	6,621	7,004	7,091	7,082	6,887

Total philanthropic gift support by purpose



Total philanthropic gift support by type

Cash gifts	Amount
Corporations	\$11,419,290
Foundations	\$20,921,350
Individuals	\$54,881,988
Organizations	\$1,251,728
Trusts and estates	\$6,495,283
Subtotal	\$94,969,639

Pledge gifts	Amount
Corporations	\$11,122,812
Foundations	\$28,197,712
Individuals	\$10,924,032
Organizations	\$3,570,018
Trusts and estates	\$36,664,831
Subtotal	\$90,479,404

Gifts-in-kind	Amount
Corporations	\$14,258
Foundations	\$0
Individuals	\$27,748
Organizations	\$44
Subtotal	\$42,049

TOTAL	\$185,491,092
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¹ Donor-targeted gifts to research in all mission areas.
² These dollars fund institutional peer-reviewed research.

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MD Anderson provides cancer care at several convenient locations throughout the Greater Houston area, including the Texas Medical Center, League City, Memorial City, Sugar Land, West Houston, The Woodlands, and the Gynecologic Oncology Clinic at the Woman's Hospital of Texas. As part of the MD Anderson Oncology Program at Lyndon B. Johnson Hospital, a team of MD Anderson doctors provides cancer care to underserved Texans in collaboration with Harris Health System. MD Anderson also collaborates with community hospitals and health systems across the U.S. and the globe through MD Anderson Cancer Network®.

MD ANDERSON CANCER NETWORK®

www.mdanderson.org/cancernetwork

PARTNER MEMBERS

- Banner MD Anderson Cancer Center (Greater Phoenix, AZ; Northern Colorado)
- Baptist MD Anderson Cancer Center (Jacksonville, FL)
- MD Anderson Cancer Center at Cooper (Camden, NJ)
- Scripps MD Anderson Cancer Center (La Jolla, CA)
- UTHealth San Antonio MD Anderson Cancer Center (San Antonio, TX)

PARTNER EXTENSIONS

- Banner MD Anderson Cancer Center at North Colorado Medical Center (Greeley, CO)
- Banner MD Anderson Cancer Center at McKee Medical Center (Loveland, CO)

CERTIFIED AFFILIATES

- 16 health systems and hospitals in 13 states

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- MD Anderson Cancer Center Madrid (Madrid, Spain)
- Vehbi Koc Foundation American Hospital (Istanbul, Turkey)

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The annual report and Conquest magazine are published by the MD Anderson Cancer Center Board of Visitors on behalf of MD Anderson.

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*Current as of Dec. 31, 2019



The University of Texas
MD Anderson Cancer Center
Strategic Communications - 600784-30-107175-55028-21
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