

CONQUEST

THE UNIVERSITY OF TEXAS
MD Anderson
Cancer Center

Making Cancer History®

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Expecting the Unexpected

The Father of Tamoxifen

V. Craig Jordan turned a failed drug
into a lifesaving treatment
for millions of women



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

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Photo: Robert Seale



ON THE COVER

V. Craig Jordan, Ph.D., has devoted his career to improving targeted breast cancer treatments for women. Along the way, he was a captain in the British Army's Intelligence Corps and a reserve officer in the British Special Air Service.

Join our community



#endcancer

Photo: Wyatt McSpadden



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ABOUT THIS ISSUE

Expecting the Unexpected

Science is almost always a process of slow and methodical discovery. Experiments must be replicated several times to confirm that results are consistent, accurate and valid. Clinical and laboratory trials can take years, even decades, to complete. But every now and then, a finding is uncovered – often incidental to the main aim of the research – that appears suddenly and is entirely unexpected.

Take, for example, the history-changing discovery in 1928 that led to the creation of penicillin. Scottish biologist Alexander Fleming took an August vacation from his day-to-day work in the lab investigating staphylococci bacteria, commonly known as staph. When he returned, he found a strange fungus growing on a culture he had left in his lab – a fungus that had killed off all surrounding bacteria in the culture. Penicillin, the world's first antibiotic, was created from this fungus. The drug went on to save millions of lives, and modern medicine was never the same.

Several MD Anderson doctors and scientists have encountered similarly unexpected research results, and their stories are highlighted in this issue of Conquest. One such researcher is V. Craig Jordan, Ph.D., a professor of Breast Medical Oncology. Jordan is nicknamed the "Father of Tamoxifen" for turning a failed contraceptive into a breast cancer prevention and treatment drug credited with saving the lives of millions of women.

Pedro Ramirez, M.D., spent much of his career at MD Anderson teaching colleagues how to conduct minimally invasive hysterectomies for the treatment of early-stage cervical cancer. Last year, a study headed by Ramirez found that cervical cancer patients would live longer, healthier lives if surgeons abandoned their minimally invasive approach and returned to the traditional method of performing hysterectomies.

Such unexpected acts of discovery arrive not by choice but by chance. When they do, everyone benefits. Of course, it helps to have leading scientists devoting their lives to the pursuit of curing diseases.



Photo: Nick de la Torre

Children participate in a relay race as part of the Be Well Baytown program, which aims to increase healthy behaviors and reduce cancer risk.

Taking it to the streets

Cancer prevention programs expand beyond the walls of MD Anderson

By Clayton Boldt, Ph.D.

When U.S. Surgeon General Jerome Adams, M.D., visited MD Anderson last December, he urged the institution's health care professionals to not only work toward developing new cancer treatments, but also to direct their efforts at preventing cancer wherever possible.

Ernest Hawk, M.D., vice president and division head of Cancer Prevention and Population Sciences, understands well how prevention efforts can save lives.

"It's estimated that between one-third and one-half of all cancers are preventable in 2019. But to achieve that goal, we have to take action at the personal and population levels," says Hawk.

MD Anderson has long worked to advance cancer prevention through research, education and patient care. With the launch of the Moon Shots Program®, MD Anderson expanded its commitment by establishing the cancer prevention and

control platform – an engine to help the institution continue taking cancer prevention programs beyond the walls of MD Anderson and into communities where people live. These programs must be evidence-based, meaning they draw upon the best available research to improve people's health; scalable, meaning they can be replicated or expanded over time to meet the health needs of large populations; and impactful, meaning they make a measurable improvement.

"The platform complements our traditional efforts by working to advance public policies, educational programs and the delivery of community-based services at the population level in order to reduce cancer risk," says Hawk, who co-leads the platform. "Most importantly, the platform helps MD Anderson address cancer risk factors where they concentrate in our population – among underserved and less-connected sectors of the population."

The Moon Shots Program is a collaborative effort that



Photo: Nick de la Torre

Volunteers distribute fresh produce to residents of Baytown, the third largest city in Harris County.

aims to accelerate the development of scientific discoveries into clinical advances that save patients' lives. To enable this mission, the program created 10 research platforms that provide unique expertise, technical support and infrastructure to support MD Anderson and Moon Shots® teams.

In the spirit of the Moon Shots Program, the platform is a team-based effort, with 10 employees leading a variety of programs. These programs interact with and complement one another, and operate through dynamic collaborations with the Moon Shots and MD Anderson experts. The platform is led by Hawk, Mark Moreno, vice president of Governmental Relations, and Michael Walsh Jr., the platform's executive director.

"The Moon Shots Program helped us better organize our experts and resources so that we could further dedicate ourselves to community-based actions that advance cancer prevention," says Hawk. "It's a great honor and privilege to be able to work outside our walls to try and make a difference in the community. We have a passionate team, all of whom are energized by the potential of making a very big difference in Houston, across Texas and beyond."

Two programs that epitomize the mission and scope of the platform are Be Well™ Communities, focused on empowering communities to lead healthier lives, and EndTobacco®, working to eliminate the burden of tobacco use and nicotine addiction.

Be Well Communities

Be Well Communities is a place-based strategy for cancer prevention, meaning the platform works with specific communities to establish initiatives that improve wellness, which lowers the risk of cancer and a variety of other chronic diseases.



Photo: Wyatt McSpadden

Ernest Hawk, M.D., vice president and division head of Cancer Prevention and Population Sciences, says between one-third and one-half of all cancers are preventable.

Ruth Rechis, Ph.D., is director of Be Well Communities. She was a young girl when her sister passed away from leukemia, so she's familiar with the impact cancer can have on families. As a 25-year cancer survivor herself, she also knows the challenges of treatment and survivorship.

At just 15, she was diagnosed with Hodgkin's lymphoma and went through six months of chemotherapy and radiation. Although the treatments were successful, she now lives with a higher risk for breast cancer, cardiac issues and thyroid problems, and occasional skin cancers caused by the radiation.

"I've been dealing with cancer my entire life. The idea that



Baytown residents attend a health fair that's part of the Be Well Baytown initiative, led by MD Anderson and sponsored by ExxonMobil.

we can reduce people's risk for cancer – that they may never have to endure chemotherapy or radiation or anything like that – is pretty exciting to me," says Rechis.

Baytown, the third largest city in Harris County, was selected as the inaugural Be Well Community, and the platform worked closely with the Baytown community to launch Be Well Baytown in November 2017. The initiative is led by MD Anderson and sponsored by ExxonMobil.

MD Anderson provides backbone support to more than 16 community partners in Baytown – individuals, schools, businesses, government agencies and health care providers – to put evidence-based programs into effect. These programs target five areas known to increase cancer risk, including poor diets, low physical activity, tobacco use, excessive ultraviolet radiation exposure, and limited access to recommended preventive care and screenings.

"Our goal is to take this gift of cancer prevention and put it into programs that will help people now and will be sustainable in the long term. These are programs, led by our partners, that are changing the culture of health within the communities where we work," says Rechis.

The Be Well Communities team draws upon the expertise of MD Anderson faculty as well as other programs within the platform to bring the best initiatives forward to the community.

Already in Baytown, Rechis notes evidence of behavior change, such as children eating healthier and being more physically active, and more produce being made available to Baytown residents. As programs expand and take root in Baytown, the platform is looking into launching similar initiatives elsewhere, tailored to the needs of each community.



Ruth Rechis is a 25-year cancer survivor who heads the Be Well Baytown program.

EndTobacco

The EndTobacco® program has a clear mission, evident in its name. As the leading cause of cancer and preventable deaths, tobacco use exacts a tremendous burden in the U.S. Through the leadership of Jennifer Cofer, director of EndTobacco, the platform seeks to reduce youth smoking, to limit exposure to secondhand smoke and to increase cessation attempts among current smokers.

Cofer also is driven by a personal mission. Both her



Jennifer Cofer directs MD Anderson's EndTobacco program. Both her grandparents started smoking at age 13 and died of tobacco-related illnesses.

grandparents started smoking at age 13, so she grew up around cigarettes. She battled personal health issues from secondhand smoke, but also became aware of the powerful addiction through her grandparents' struggle to quit smoking.

Motivated to make a difference for her grandparents and others, she chose to go into public health.

"I knew when I found public health that I could help change the tobacco control landscape, either through cessation, policy change, destigmatizing what smokers go through or preventing kids from starting to smoke," says Cofer. "That's what I knew my calling would be. Being here at MD Anderson is a perfect fit."

Unfortunately, both her grandparents succumbed to tobacco-related illnesses, but she was able to help them both successfully quit smoking.

Through EndTobacco, she and her team lead a variety of efforts to improve public policy, education, prevention and cessation services, both locally and nationally.

"We're implementing evidence-based actions in communities across the state. These include partnering with universities adopting tobacco-free policies, or training health care providers to deliver best practices for tobacco-cessation treatment," says Cofer. "We have the honor and privilege of enabling substantial actions to end tobacco-related cancers."

For instance, EndTobacco coordinated with The University of Texas System to launch the Eliminate Tobacco Use initiative in 2016. Representatives from all 14 UT System institutions joined together to discuss best practices and policies, and by June 1, 2017, all 14 institutions were tobacco-free. The initia-

Prevention and control platform programs

Be Well Communities is just one of the program areas of the cancer prevention and control platform.

Others include:

- EndTobacco
- Increasing HPV vaccination rates
- Preventing hereditary breast and ovarian cancer
- Reducing exposure to ultraviolet radiation

tive continues to grow each year, and now includes additional universities across Texas and around the nation.

EndTobacco also served as an educational resource to policy makers passing legislation to raise the minimum age for buying tobacco products and e-cigarettes from 18 to 21, with the exception of those in the military. The program also established a program to train health care providers to deliver MD Anderson's state-of-the-art tobacco cessation approach to their patients.

These programs have the potential to save thousands of lives from tobacco-related disease, ultimately aligning perfectly with the goals of the platform and the Moon Shots Program – to save lives through scientific discoveries.



Wade Smith is an antique car collector, a dentist and a tonsil cancer survivor who teaches his patients how to detect and prevent oral cancers.

Driving the cancer prevention message home

By Kellie Bramlet Blackburn and April Clayton

Wade Smith knew something was wrong when he spotted the lump on his neck while shaving one morning in September 2015. He wasn't too surprised when Steven Frank, M.D., a radiation oncologist and director of MD Anderson's Proton Therapy Center, told him it was tonsil cancer. And he wasn't even surprised when Head and Neck Surgery professor Neil Gross, M.D., told him that the biopsy revealed that the cancer was caused by the human papillomavirus, more commonly called HPV.

As a dentist specializing in making replacements for teeth and parts of the jaw, Smith was very familiar with the rising

numbers of men, middle-aged and older, being diagnosed with HPV-related head and neck cancers.

"Head and neck cancers were already something I was talking to my patients about. And now I'm even quicker to tell them about HPV-associated cancers, what signs they should look for and how it can be prevented through vaccines," Smith says. "I also tell them that I had an HPV-associated cancer to show just how common it really is. It doesn't bother me to tell people that I've had it."

Smith isn't alone. According to the Centers for Disease Control and Prevention, 14,800 men and 3,400 women are diagnosed with new cases of HPV-associated oropharyngeal



Neil Gross, M.D., center, was an early user of robotic surgery to treat head and neck cancers. The technology allows surgeons to access hard-to-reach areas in the mouth and throat.

cancer, also called throat cancer, each year. The average age at diagnosis is 61 and 62 for men and women respectively.

In the past, many cases of head and neck cancers were typically thought of as associated with tobacco. It was spotted in older patients who had used tobacco for years. Often, the prognosis wasn't good. But now, that's changing. Recent studies show that more than 70 percent of throat cancers are linked to HPV.

"We're seeing an epidemic of HPV-related throat cancers," says Faye Johnson, M.D., Ph.D., associate professor of Thoracic, Head and Neck Medical Oncology at MD Anderson.

But there is some good news. These cancers respond well to treatment, giving patients a prognosis for disease-free survival of 80 percent.

"These cancers are treatable, but historically the treatment was very difficult for the patient. The treatment-related side effects can affect our patients for the rest of their lives," Johnson says. "So our mission has evolved to help patients not only beat cancer, but allow to them to do so while experiencing fewer side effects and a better quality of life."

MD Anderson is tackling every stage of fighting this increase in HPV-related head and neck cancers, including efforts in research, treatment – including advances in chemotherapy, immunotherapy, radiation and surgery – survivorship and prevention.

Treatment

When patients with HPV-related head and neck cancers first come to MD Anderson, they enter the "fast track program," a streamlined program that helps patients get in and

HPV-ASSOCIATED OROPHARYNGEAL CANCER (THROAT CANCER)

14,800

New cases diagnosed in men each year

61

Average age of diagnosis for men

3,400

New cases diagnosed in women each year

62

Average age of diagnosis for women

out quickly. Since it launched about four years ago, nearly 1,000 patients have gone through the program. They meet with different members of the multidisciplinary team, including specialists from Radiation Oncology, Medical Oncology, Dental Oncology, Surgery and Speech Pathology, because many patients undergo multiple types of treatment. Here's how MD Anderson's physicians and researchers are working to make improvements in each of these treatment areas:

Immunotherapy: Working with surgeon-scientist Neil Gross, M.D., medical oncologist Renata Ferrarotto, M.D., is focusing on identifying predictive biomarkers that can be used to select patients who will benefit most from immunotherapy.

The goal of the project is to determine if the immunotherapy drug durvalumab alone or in combination with tremelimumab, another immunotherapy drug, can control or shrink cases of oropharyngeal squamous cell carcinoma before standard-of-care surgery is conducted.

Surgery: Historically, surgery was a common type of treatment. But over time, doctors moved away from it because recovery from these surgeries was so difficult. But as surgical advances and treatments improved with the advent of robotics, surgery for oropharynx cancer, like Smith's, is becoming more common again.

And now MD Anderson surgeons have a new robotic tool to help them perform less invasive surgeries that help patients heal more quickly. Unlike other robots used in surgery, the Da Vinci SP is designed specifically for operating on the mouth and throat, which without the robot's camera and arms can be difficult to reach. The robot recently was approved by the Food and Drug Administration for treating head and neck cancers.

"The robotic arms are small and nimble, and the camera makes me feel like I'm almost inside the patient's mouth," Gross says.

Radiation: Radiation therapy techniques have changed significantly over the past two decades as a result of improvements in engineering and delivery: the use of photon energy, intensity-modulated RT and adaptive RT that individually tailors the treatment and reduces the intensity of side effects. Customized radiation stents – now being fabricated by 3D technology – allow for the oral cavity to be placed in a repeatable position throughout the course of treatment reducing soft and hard tissue damage.

Curtis Pickering, Ph.D., assistant professor of Head and Neck Surgery, conducted a study that may change the course of future treatment plans. His study identifies a genetic biomarker that separates HPV-positive patients into two groups. This grouping can potentially provide the radiation oncologist with the genetic information needed to assess whether a patient will need to intensify treatment or be safe for de-intensified treatment, based on the HPV-positive grouping. The primary focus is to ensure patients have the highest possible quality of life after treatment ends.

"What I'm hoping is we've found some new fundamental aspects of HPV biology related to the carcinogenic process, the progression of the tumor and response to therapy," Pickering says. "If we're able to validate this in future studies, it could be incredibly clinically useful across several HPV-related tumor types." Gross and Pickering are now working together to put this test into practice.

Side effects

Even with the steps MD Anderson doctors are taking to minimize side effects, head and neck cancer patients do often experience them – especially since these patients are young and have many years of life ahead, giving them more time to develop side effects. And given the sensitive areas that have been treated, the symptoms – like dry mouth, trouble speaking or swallowing – can be painful and life-altering. MD Anderson is working to not just treat the cancer, but also to ease the side effects of treatment.

About 10 days into radiation, patients may start experi-



Medical oncologist Renata Ferrarotto, M.D., conducts research to determine which patients will benefit from immunotherapy.

encing some side effects. MD Anderson has a team of oral oncologists and maxillofacial prosthodontists to assist those patients, whether by adjusting their diet to ease symptoms or creating dentures or prostheses especially for them.

"Each patient with head and neck cancer will have a personalized approach to oral care to include oral cleaning, soft tissue protectants, oral opening exercise and tooth decay prevention based on outcomes and research," says Mark Chambers, D.M.D., a professor of Head and Neck Surgery.

In addition, about 5 to 10 percent of patients with mouth and throat cancers will develop difficulty swallowing. This often occurs about eight years after cancer treatment has been completed. To help this specific patient population, MD Anderson created the Radiation Swallowing Pathway and Swallowing Boot Camp Program.

"We organize swallowing therapies into a stepwise, intensive program to fit the needs of patients with head and neck cancer along their journey of survivorship," explains speech-language pathologist Kate Hutcheson, Ph.D., who is conducting research designed to improve patients' ability to comfortably swallow.

The goal is for all patients to receive basic therapies to help them maintain swallowing function during and after cancer treatment.

Since its inception nearly seven years ago, more than 130 patients with more severe swallowing problems have completed the boot camp. This highly interdisciplinary program takes patients through a stepwise program often culminating in three weeks of daily therapy. During this time, patients work on therapeutic exercises and swallowing practice under the



Speech-language pathologist Kate Hutcheson conducts a "swallowing boot camp" to help the 5-10 percent of head and neck cancer survivors who develop difficulty swallowing after treatment.

"We hope to one day eliminate the problem of HPV-related head and neck cancers through vaccination and screening."

— Erich Sturgis, M.D.

guidance of a speech pathologist. While the techniques do not completely reverse the side effects, most patients experience functional gains and report an improved quality of life after completing the boot camp, and many are able to avoid feeding tubes.

"The program is personalized and its impact is different for each patient, but the goal is to help each patient live better with the swallowing problem," Hutcheson says.

Hutcheson is currently conducting research to help determine which patients are most likely to experience difficulty swallowing in hopes that such therapy techniques could be used earlier as a form of prevention.

Prevention

But it's not enough to improve treatments used for HPV-associated head and neck cancers. MD Anderson experts often say the best way to treat cancer is to prevent patients from ever developing cancer in the first place.

The only way to prevent HPV-related head and neck cancer is through a two-dose preventive vaccine, recommended by the CDC for boys and girls (age 11-13) and a three-dose vaccine

for those up to age 26 who were not vaccinated before their 15th birthday. Because HPV vaccination rates of adolescents in the U.S. are modest and many people are too old to be reliably protected by vaccination, the HPV-associated throat cancer epidemic is expected to continue for some time.

Unlike cervical cancer, HPV-related oropharyngeal cancer does not have a standardized screening process.

"We don't have a pap smear for the throat, but we desperately need something equivalent to allow for earlier detection," Gross says.

Erich Sturgis, M.D., professor of Head and Neck Surgery, is the primary investigator for the HPV-related Oropharyngeal and Uncommon Cancers Screening Trial of meN (HOUSTON) study. Its goal is to determine the relationship between HPV and the cancer risk in those men who test positive for the cancer-causing "E" proteins in HPV type 16.

"Without screening, most HPV-related cancers are diagnosed later, requiring complicated care that often includes a combination of radiotherapy, chemotherapy and/or radical surgery," Sturgis says.

The study aims to discover whether HPV screening can help determine which patients have a higher risk of developing HPV-related oropharyngeal cancer, placing the focus on early detection.

"The introduction of the pap smear brought about dramatic declines in cervical cancer incidence and death rates," Sturgis says. "We hope to one day eliminate the problem of HPV-related head and neck cancers through vaccinations and regularly scheduled screenings."

A warrior for women's health

For many years, groundbreaking breast cancer researcher V. Craig Jordan was also a member of the elite British Special Air Service

By Michael Hardy

This year, V. Craig Jordan, Ph.D., became the first medical scientist to be included in an elite cadre of individuals appointed to the British honors system.

A professor of Breast Medical Oncology and Molecular and Cellular Oncology at MD Anderson, Jordan holds dual American and British citizenships. Queen Elizabeth II this summer appointed him “Companion of the Most Distinguished Order of St. Michael and St. George” for services to women’s health. The honor celebrates his discovery and development of a group of medicines called Selective Estrogen Receptor Modulators (SERMS), which reduce breast cancer incidence in high-risk women.

The Order of St. Michael and St. George is the sixth-most senior in the British honors system. Its insignia depicts saints at war, a fitting image that symbolizes not only Jordan’s heroic efforts on behalf of women’s health, but also his extensive military service.

For the past 50 years, Jordan has led what he calls a “double life.” For his day job, Jordan developed breakthrough breast cancer treatments, pioneering the estrogen-blocking drug tamoxifen, which has been credited with saving the lives of millions of women worldwide.

But he also served as a reserve officer in the British Special Air Service (SAS), one of the most elite military units in the world. Founded in 1941, the SAS is the rough equivalent of the U.S. Army Green Berets or Navy SEALs — a small, secretive fraternity of Special Forces soldiers and intelligence officers. In the event of a nuclear war between the Soviet Union and the West, Jordan would have deployed to Germany as an expert on nuclear, chemical and biological weapons.

“I was the Indiana Jones of medicine,” as Jordan puts it.

Jordan’s remarkable story begins in New Braunfels, Texas, where he was born in 1947. His parents — an English mother and an American father — met during World War II in London, where his mother was serving as a fire service officer in charge of 20 young women whose job it was to guide fire engines to houses that had been bombed. His father, an officer in the U.S. Army Corps of Engineers, was training for the D-Day invasion.

When Jordan was 3, his parents divorced and his mother took him back to her home county of Cheshire, in northwest England. It was there the future cancer researcher developed an obsession with chemistry after



Photo: Robert Seale

V. Craig Jordan, Ph.D., discovered and developed the breast cancer treatment and prevention properties of tamoxifen, a drug that has saved millions of lives.



Courtesy photos

Captain V. Craig Jordan of the British Army's Intelligence Corps, left, receives an award from Region 1 Director Allen Zenowitz, center, commending Jordan's service from 1972-74 as the Nuclear, Chemical and Biological Warfare staff officer. Colonel Robert Davenport, right, was Jordan's wartime commanding officer.

discovering some old textbooks at a neighbor's house. As a teenager, Jordan built a chemistry lab in his bedroom, which he stocked with sulfuric acid, mercury and other dangerous compounds he had finagled from his grammar school and a local pharmacy.

While studying pharmacology at the University of Leeds, Jordan, inspired by his maternal grandfather's wartime service, joined the Officers' Training Corps and volunteered for courses in chemical and biological warfare. Because of his scientific background, Jordan was recruited into the British Army's Intelligence Corps, becoming the youngest captain in the service. Eventually he went on to join the SAS, where he received weapons and intelligence training.

Meanwhile, Jordan's academic career was taking off. He wrote his doctoral dissertation on the anti-estrogen drug ICI-46474, better known as tamoxifen, which had been developed by Imperial Chemical Industries (ICI) to block estrogen and prevent pregnancy. When tamoxifen turned out to increase, not decrease, fertility in women, ICI nearly gave up on the drug. But Jordan convinced the company to let him experiment with it as a treatment for breast cancer.

"They said, 'There's no money in this,'" Jordan recalls. "If we put every single patient in Britain who's got metastatic breast cancer on tamoxifen, we'll make about 12,000 pounds a year."

It was Jordan's research team at the University of Leeds that uncovered how to effectively use tamoxifen to treat breast cancer in patients whose disease is fueled by estrogen. Jordan developed the strategy of long-term adjuvant tamoxifen therapy, as well as describing and deciphering the properties of a new group of medicines called selective estrogen receptor modulators (SERMs). The team's results were published in a 1977 paper that laid the groundwork for the five SERMs that have been approved by the Food and Drug Administration (FDA).



Diana, Princess of Wales, accepted Jordan's invitation to speak at a breast cancer conference in Chicago in 1996.

Jordan also discovered the preventive abilities of tamoxifen and raloxifene, also a SERM drug. The FDA approved the medicines for reducing breast cancer incidence in high-risk women. Jordan was chair of the scientific committee for the trial.

Tamoxifen remains one of the world's most successful cancer drugs and is on the World Health Organization's list of essential medicines. The drug is estimated to have saved the lives of millions of women around the world. So many that "nobody can really keep track anymore," Jordan says.

After occupying prestigious positions at the University of



American and British Union flags were displayed on Memorial Day 2017 near the reflecting pool in Washington D.C., to represent soldiers from both nations who fell during the Iraq and Afghanistan wars. Jordan is a citizen of both countries and helped secure the British flag's representation.

Leeds, Switzerland's Ludwig Institute, the University of Wisconsin-Madison, Northwestern University, Fox Chase Cancer Center and Georgetown University, Jordan returned to Texas in 2014 after being recruited to MD Anderson.

He was elected to the National Academy of Sciences in 2009, and the National Academy of Medicine in 2017. Jordan received the Sir James Black Award from the British Pharmacological Society in 2015, the Endocrine Society's Aurbach Award for Translational Research in 2018, and the American Society for Pharmacology and Experimental Therapeutics' Reynold Spector Award in 2019. In 2002, Queen Elizabeth II named him Officer of the Most Excellent Order of the British Empire for his work with tamoxifen and his services to international breast cancer research. In 2016, the German Society of Gynecology and Obstetrics named Jordan one of the "Big Four of the Millennium," celebrating the four medical scientists whose work in the 20th century created the standard of care for women in the 21st century.

A mandatory retirement age of 55 forced Jordan to leave the SAS, but he remains a member of the SAS Regimental Association. General Sir Michael Rose, a former SAS Commander, sponsored him, with the citation, "this officer has

saved more lives than any member, regular or reserve, in the regiment's history."

During Jordan's tenure at MD Anderson, he was the honorary Colonel of Leeds University Officers' Training Corps, and made regular training visits back to Leeds. But it was on an American Airlines' flight, when he was wearing his SAS lapel wings, that Jordan was approached by flight attendant Christiana Cruz about a project called "Honor our Heroes."

On Memorial Day 2017, the project placed flags near the reflecting pool in Washington D.C., in honor of every American who fell during the Iraq and Afghanistan wars. Jordan saw the opportunity to sponsor the display of a Union Flag for each of the British Fallen as American allies. He sought authorization through the military attaché at the British Embassy in Washington, D.C., who attended the ceremony.

When asked why he continued his national service while enjoying a successful career in research and investing in prizes and scholarships for young students, Jordan laughs as if the answer were obvious.

"I'm a participant," he says. "This was my way of paying back the free education I received in Britain. That sense of service is very, very strong in me."



Dense breasts and cancer risk

What women need to know

By Ina Fried

After her mother's death from aggressive breast cancer almost 10 years ago, Rosie Ybarra's mammogram showed that she had dense breast tissue and fibrocystic breasts – prone to lumps.

Following cyst drainage on several worrisome but benign lumps, Ybarra did research to find a physician who would follow her closely and help set her mind at ease.

Her research led her to MD Anderson.

Dense breast tissue made it difficult to detect Rosie Ybarra's breast cancer with a mammogram.



Rosie Ybarra calls her oncologist, Powel Brown, M.D., Ph.D., “an angel” for recommending advanced breast screenings that caught her cancer early.

Because of Ybarra’s family history and her dense breast tissue, which makes it more difficult to see cancer on a mammogram, her oncologist, Powel Brown, M.D., Ph.D., professor and chair of Clinical Cancer Prevention, put her on a yearly schedule in which she would have a mammogram and an ultrasound, alternating six months later with a breast MRI.

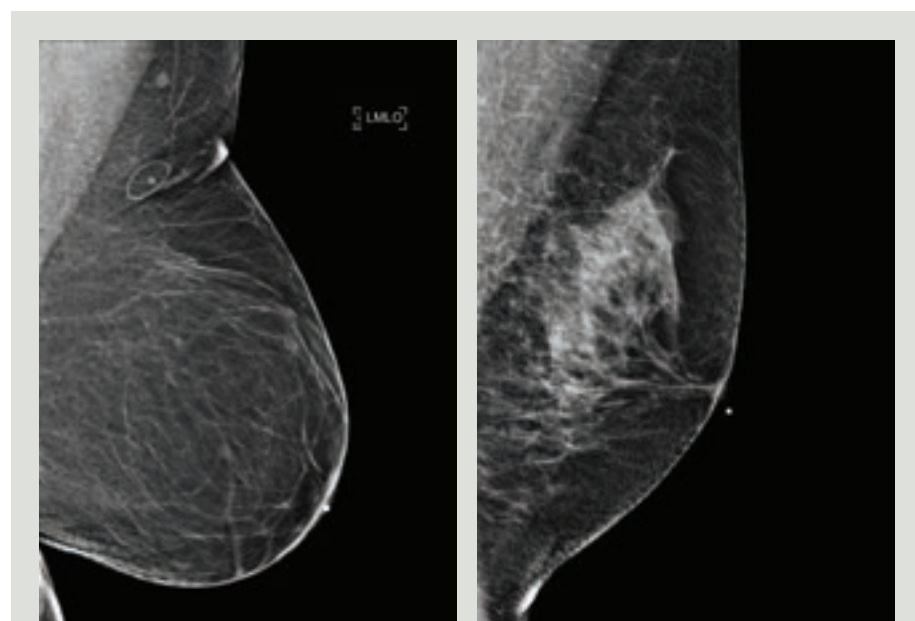
“When they did my ultrasound and mammogram in June 2018, the images were negative, and everything looked good,” Ybarra says. “When I came back in December, they did an MRI of my breasts, and they picked up a suspicious spot.”

An MRI biopsy revealed lobular breast cancer, a rare form. This February, she underwent a double mastectomy – her left breast for treatment and her right breast as an elective preventive measure.

“I call Dr. Brown my angel because if we hadn’t been persistent and doing both the MRI and the ultrasound, the cancer would not have been picked up at that time. Women have to take charge of their own medical care and ask questions,” Ybarra says.

Risk factors

Having a close relative with breast cancer has long been known to increase a woman’s risk of breast cancer, along with age, certain genetic mutations and several other risk factors.



Dense breast tissue can hide cancer

Non-dense breast tissue (left) appears gray on a mammogram, while tightly packed dense breast tissue (right) appears white. Tumors also appear white, which makes it more difficult to detect cancer in dense breasts.

Density is not related to breast firmness, but to the way the tissue appears on a mammogram. Dense breasts have less fatty tissue, which appears dark on a mammogram, and

more glandular tissue, which appears white. Dense breasts make it harder for mammograms to detect cancer, because cancer also appears white.



Diagnostic radiologist Marion Scoggins, M.D., says 3D mammography is an improvement over 2D mammography, because it enhances breast cancer detection with fewer false positives.

Several epidemiologic studies have shown that dense breasts also impose a higher risk of breast cancer. It’s estimated that about half of women who get mammograms have dense breasts. For most women, breasts become less dense with age.

In February 2019, a federal law passed requiring all mammography providers to notify patients if they have dense breasts and to tell them that breast density can hide cancer on a mammogram. The law also instructs mammography providers to advise patients to

consult with their doctors. Thirty states already have similar laws, but the federal legislation will standardize the requirement and the notification’s wording throughout the country.

Screenings

Regular mammograms are still the best way to find breast cancer early. In the U.S., an annual screening mammogram is recommended for women who are 40 or older.

“That is the only test that has been shown to decrease the mortality of breast cancer,” says

Several epidemiologic studies have shown that dense breasts impose a higher risk of breast cancer. It’s estimated that about half of women who get mammograms have dense breasts. For most women, breasts become less dense with age.

Marion Scoggins, M.D., associate professor of Diagnostic Radiology-Breast Imaging.

Most centers now use digital mammography, rather than film, because radiologists can fine-tune the digital electronic images so that tiny abnormalities stand out better. A more recent improvement is 3D mammography, called tomosynthesis. The procedure is the same as for 2D mammography, but tomosynthesis improves detection of breast cancer with fewer false positives.

“We’ve been educating our patients about the availability of tomosynthesis for many years. Tomosynthesis is really a better mammogram for all women, and it does not require a doctor’s order,” Scoggins says.

If a woman’s breast tissue is dense on mammography, a breast ultrasound is the most common test recommended in addition to a mammogram. Ultrasound is an inexpensive test that does not expose a woman to radiation.

A breast MRI currently is recommended only for women at high risk. Until further data become available, there is not sufficient scientific evidence to recommend MRI screening for average-risk women.

Clinical trial

At MD Anderson and four other U.S. sites, a clinical trial is testing whether a tamoxifen gel, applied once a day for a year, rather than ingesting tablets, can reduce breast density and the risk of breast cancer.

“The tamoxifen tablet is the only Food and Drug Administration-approved agent for breast cancer prevention, but because of concerns for side effects, a number of high-risk women don’t feel comfortable taking it,” says Banu Arun, M.D., the clinical trial’s principal investigator and MD Anderson professor of Breast Medical Oncology. “The gel, which, in preliminary findings, is associated with minimal side effects, could be an exciting alternative.”

Turning a hypothesis on its head

Cancer studies can unexpectedly reveal unanticipated truths and lead investigators and clinicians in new directions

By Kellie Bramlet Blackburn

IN 2018, MD Anderson's Gynecology Oncology and Reproductive Medicine physicians decided to change how they talked to their cervical cancer patients about surgical options. They would stop touting the ease of recovery from minimally invasive radical hysterectomies and spend more time talking about the associated risks.

The charge was led by a surprising source: Pedro Ramirez, M.D., the director of Minimally Invasive Surgical Research and Education, a gynecologic oncologist who had built much of his career on embracing and teaching others how to successfully adopt minimally invasive surgery.

Ramirez had just completed a study comparing surgical techniques for radical hysterectomies, the standard of care for early-stage cervical cancer patients. And to him, it was now clear that cervical cancer patients would live longer, healthier lives with lower risk of recurrence if surgeons abandoned minimally invasive radical hysterectomies and instead relied on abdominal hysterectomies, also called "open" hysterectomies.

"You have to be willing to put what you believed in aside if it means saving more patients' lives," Ramirez says.

A surprising discovery

When Ramirez and his team started the study in June 2008, they planned to include 740 patients.

But when the results were published in the *New England Journal of Medicine* in the fall of 2018, the study only included data from 631 patients.

That's because Ramirez received word from the data and safety monitoring committee that the study needed to close

to any new patients in September 2017. An interim analysis demonstrated that one of the techniques was harming patients.

The data and safety monitoring committee met with Ramirez to share the results. Patients who had minimally invasive radical hysterectomies were four times more likely to develop a recurrence than those who had an abdominal hysterectomy. Their survival rates were lower, too.

Ramirez was shocked. No one had expected this. The study itself had been routine, expected to conclude with no surprises.

"From then on I knew we had a responsibility to our patients. We had to give them all the information, and if necessary, change how we do surgery," Ramirez says.

Making clinical practice changes

Although it hadn't been published yet, Ramirez presented his research at the Society of Gynecologic Oncology annual meeting, one of the largest and most prestigious conferences for gynecologic oncologists. Ramirez looked at the faces of the audience members. Some sat, their mouths open in shock. Others exchanged skeptical whispers.

Not all surgeons have met the study with open arms. For some, it signifies the potential end of a technique for cervical cancer hysterectomies that they may have spent years perfecting or even built reputations and practices on.

But two other retrospective studies – one led by Alejandro Rauh-Hain, M.D., an MD Anderson gynecologic oncologist, and the other from Northwestern University – that evaluated large national databases, echo with similar findings.



Gynecological oncologist Pedro Ramirez, M.D., was surprised when his study revealed that women who had minimally invasive surgery for the treatment of early-stage cervical cancer fared worse than those who had "open surgery" performed through a large incision in the abdomen.

"I believe acceptance is a very important part of life and medicine. After all, challenging what we already know is exactly why we do research."

— Pedro Ramirez, M.D.

"It's not just once, but three times, we've seen these results," Ramirez says.

The rest of the Gynecologic Oncology and Reproductive Medicine faculty, Ramirez' colleagues and leaders, knew they needed to take action in response to the study to set an example for other surgeons.

"The scientific standard is publication, not an abstract, but based on the information we had, we all felt comfortable making the change," says Amir Jazaeri, M.D., who at the time was serving as the ad-interim chair of Gynecologic Oncology and Reproductive Medicine.

Typically, the department's faculty hold retreats twice a year to review recent studies and determine if they should make any changes to their everyday practices. This study brought change outside the normal routine, explained Pamela Soliman, M.D., a gynecologic oncologist and director of the Gynecologic Medical Center at MD Anderson.

"Since the research was done here, we had more information and were able to make changes quickly," Soliman says.

The data didn't reveal why minimally invasive surgery had a higher risk of recurrence. The study wasn't set up that way. But the increased risk was enough to motivate change.

"A lot of questions remain unanswered, but this data signified a need for such a big change, we didn't feel like it could wait until the retreat," Jazaeri says.

Now, Ramirez hopes the rest of the gynecologic oncology community will accept the findings, too, and make similar changes to help patients live longer without recurrence.

"I believe acceptance is a very important part of life and medicine," Ramirez says. "After all, challenging what we already know is exactly why we do research."

“One of the biggest things this study demonstrates is the importance of asking the question correctly. If you don’t design the experiment well, and you get unexpected results, you don’t know if those results are correct or if you just didn’t ask the question correctly.”

— Jennifer McQuade, M.D.

Photo: Thomas Campbell



A study that indicated obese males were more likely to survive advanced melanoma than normal-weight males puzzled Jennifer McQuade, M.D., who is a strong believer in a healthy diet and exercise.

Confronting contradiction

Metastatic melanoma study brings surprising results

By Jacqueline Mason

For Jennifer McQuade, M.D., the surprise was a counterintuitive finding that linked obesity with improved survival in male patients with metastatic melanoma.

“We know obesity increases the risk of getting many cancers and is associated with worse survival in many cancers,” she says.

So there were reasons to think – based on the same biologic pathways – metastatic melanoma would be the same, says McQuade, an assistant professor of Melanoma Medical Oncology.

She had difficulty believing the initial study findings.

“At first, I had blinders on and totally missed the obesity paradox,” she says, describing the study’s contradiction to established evidence linking obesity to mortality risk.

She proceeded carefully in examining five subsequent independent cohorts before concluding that, yes, obese

males on targeted therapy were more than twice as likely to survive metastatic melanoma at two years compared with normal-weight males.

There were similar results for obese males on immunotherapy, but not on chemotherapy – and not at all for females.

“The disappointment was that I’m a strong believer in a healthy diet and exercise,” says McQuade. “I went into this study looking for evidence to support that cancer patients may be able to influence their outcomes by controlling their weight.”

Instead, now McQuade and colleagues are examining the biological basis for this obesity paradox.

“One of the biggest things this study demonstrates is the importance of asking the question correctly,” she says. “If you don’t design the experiment well, and you get unexpected results, you don’t know if those results are correct or if you just didn’t ask the question correctly.”

Photo: iStock



Teaching old drugs new tricks

By Ronda Wendler

Developing a new cancer drug in the laboratory, then shepherding it through the steps required to seek Food and Drug Administration approval requires an average of 13 years and \$1.8 billion, according to the National Institutes of Health.

Even then, only 5 percent of oncology drugs ultimately are approved. And many of these are highly expensive and create numerous side effects.

To deliver drugs to patients faster, more efficiently and at less cost, scientists are studying whether pharmaceuticals already approved to treat one disease can be safely and effectively used to treat another – a process known as drug repurposing.

“An existing drug has already been through years of preclinical and clinical studies required by the FDA, therefore much of the heavy lifting has already been done,” says Michael Rosenblum, Ph.D., professor of Experimental Therapeutics. “Starting with an old drug with a known clinical history can significantly reduce the time and cost associated with developing new cancer drugs.”

Many unrelated diseases share common molecular characteristics, Rosenblum explains. This means that two completely different diseases may respond to the same drug.

“It’s estimated that about 90 percent of

FDA-approved compounds can be used for more than one purpose,” he says. “We can teach old drugs new tricks by matching them to the molecular pathways of other diseases.”

Accidental Success

Most successful cases of drug repurposing are largely serendipitous discoveries – coming more by chance than intent.

Tamoxifen was originally designed to block estrogen in the hopes of preventing pregnancy. It failed as a contraceptive, but research showed the drug blocks the estrogen which fuels certain types of breast cancer. Today, tamoxifen is one of the world’s most successful and widely prescribed drugs for the treatment and prevention of breast cancer.

Minoxidil was initially used as a high blood pressure medication, but was reformulated into the topical cream Rogaine after patients experienced hair regrowth.

Viagra was first tested as a cardiovascular disease treatment, but when study participants began experiencing erections, the drug was redesigned as an erectile dysfunction therapy.

Hundreds of repurposing possibilities still exist, Rosenblum says.

“More and more, repurposing is being recognized as a faster, cheaper and safer way to drive therapies to patients,” he says. “It’s the smart way to develop new drugs.”

Repurposed drugs

Raloxifene

The FDA approved raloxifene to reduce the risk of invasive breast cancer in postmenopausal women in 2007. It was initially developed to treat osteoporosis.

Thalidomide

This drug started out as a sedative in the late 1950s, and soon doctors began prescribing it to prevent nausea during pregnancy. It caused thousands of severe birth defects, but in 1998 thalidomide found a new use as a treatment for leprosy. In 2006, it was approved for multiple myeloma, a cancer that forms in plasma cells.

Tamoxifen

In addition to treating and preventing breast cancer, researchers discovered in 2007 that tamoxifen also helps people with bipolar disorder by blocking the enzyme PKC, which goes into overdrive during the manic phase of the disorder.

Pentostatin

This drug was tested as a chemotherapy for T-cell-related leukemias, but the cancers didn’t respond to the drug. Later, National Cancer Institute researchers found that the drug was successful in treating a rare, B-cell related leukemia, called Hairy Cell Leukemia.

Celebrex

A popular osteoarthritis drug, celebrex has also been shown to decrease the risk of additional polyp formation in people who’ve had colon cancer in the past.

Metformin

In the mid-2000s, researchers found that patients taking this common diabetes drug had a significantly lower risk for breast cancer.

ATRA

All-trans retinoic acid (ATRA) has historically been used to treat severe acne. But researchers found that when ATRA is combined with chemotherapy, the drug combination significantly decreases the chance of relapse among leukemia patients in remission.

Methotrexate

This chemotherapy drug was developed in the 1950s and since then is typically administered at a very high dose to cancer patients. At a low dose, it has become the standard of care for autoimmune diseases such as rheumatoid arthritis or psoriasis.



Debbie Colley thought she was “done for” when her rare cancer failed to respond to traditional treatments. Then the retired middle school band director joined a clinical trial at MD Anderson. Today, her tumors have shrunk by more than 70 percent.

Helping the 15 in 100,000

Learning you’re among a small group of people diagnosed with a rare cancer can be isolating

By Ronda Wendler

Debbie Colley knows firsthand how quickly life can turn upside down. “One morning, I arrived at work feeling great and ready to start the day,” says Colley, 56, a recently retired middle school band director. “But as soon as the school bell rang, sharp pangs shot through my abdomen. The pain was intense.”

A trip to the emergency room revealed Colley had a strangulated hernia, a medical condition that occurs when a section of the intestine pushes through a weak spot in the abdominal wall. This triggers the abdominal muscle to clamp down, which cuts off blood supply to the intestine, thereby “strangling” it.

Doctors operated and fixed the hernia. But now Colley faced another challenge.

The same CT scan that detected her hernia also showed a suspicious, dime-sized spot on her liver. A biopsy confirmed it was malignant.

“I was completely blindsided,” Colley recalls. “I went in with a stomach ache and came out with cancer.”

Aggressive and rare

Colley’s doctors in her hometown of Victoria, Texas, weren’t sure what type of cancer Colley had. They referred her to MD Anderson, where oncologists performed a myriad

of tests, scans and exams. Finally, her diagnosis was revealed: peritoneal mesothelioma – an aggressive and exceptionally rare cancer that attacks the peritoneum, the thin layer of protective tissue that lines the stomach and each of the abdominal organs.

“Less than 400 cases are diagnosed each year in the United States,” says Kanwal Raghav, M.D., assistant professor of Gastrointestinal Medical Oncology. “That’s miniscule compared to the 200,000 new cases of breast cancer that are identified annually in this country.”

The culprit behind most peritoneal mesothelioma cases is asbestos, a naturally occurring mineral in rocks and soil. Once lauded for its resistance to heat, this “miracle mineral” was used in everything from building materials to car brakes and hair dryers. At the height of its use from the 1930s to the late 1970s, asbestos could be found in more than 3,000 products.

Over time, however, researchers realized that when asbestos materials are disturbed or damaged, the spiny asbestos fibers can be released into the air and breathed in through the nose or mouth. When this happens, the sharp fibers can lodge in the abdomen and cause genetic damage to the cells in the abdominal lining.

Over a period of decades, malignant tumors begin to form and multiply. It’s a long, drawn-out process. Malignant tumors take anywhere from 10 to 50 years to develop after a person is first exposed to asbestos.



Debbie Colley makes the two-hour drive from her home in Victoria, Texas, to MD Anderson every three weeks for checkups.

“My dad worked at an aluminum smelting and refining plant where asbestos was used liberally in insulation and building materials to control the high-heat environment,” Colley explains. “He probably brought asbestos fibers and dust home on his work clothes and I inhaled it as a child.”

Hard to detect

One of the greatest challenges of treating a rare cancer is detecting it in the first place. Some uncommon cancers spread silently, devoid of symptoms. Peritoneal mesothelioma, for instance, typically produces no telltale warning signs until the tumors it creates begin pressing against the abdominal wall. Only then do patients begin experiencing abdominal pain and swelling, a feeling of fullness, nausea or vomiting, and changes in bowel habits – the same symptoms that occur with gallstones, irritable bowel syndrome, and ovarian cancer.

Most doctors see only a handful – if any – rare cancer cases in their lifetimes. This lack of familiarity can produce disastrous consequences.

“By the time patients come to me,” Raghav says, “they’ve often spent many months going from doctor to doctor, trying to figure out what’s wrong, while their tumors continue to spread. You’d be surprised at the number of women I see who’ve been misdiagnosed with and treated for ovarian cancer, but when we look deeper into their pathology, it turns out they have peritoneal mesothelioma instead.”

Because of these missteps, rare cancers tend to be diagnosed at a later stage, he says, and have lower five-year survival rates than other cancers.

“There’s a saying in medical school: ‘When you hear hoofbeats, think of horses, not zebras,’” Raghav explains.

Clinicians are taught that common diseases outnumber

rare ones, and therefore the simplest and most obvious explanation is usually the correct one.

“But if you’re only looking for horses, you’re missing the zebras,” Raghav says. “That’s the conundrum of diagnosing rare cancers – they’re the zebras.”

Physicians at large academic cancer centers like MD Anderson have more experience in treating “zebras,” he says. “We get the diagnosis right the first time, and we get patients into treatment faster.”

Trial and error

Colley’s treatment began with three courses of chemotherapy to shrink her tumors, followed by a grueling surgery to remove them.

“That helped,” she says. “The cancer was gone and it stayed away for six months. Then it popped right back up again.”

Next, she tried brachytherapy, a type of internal radiation where pellets containing radioactive material are placed in and around tumors to destroy cancer cells. Her cancer disappeared again, but came back.

Through it all, Colley continued to teach. Doctors at MD Anderson dubbed her “Wonder Woman.”

“I didn’t want to let the kids down,” she says. “Sure, I was tired, but I kept going.”

Nothing was working and Colley was running out of options.

“We’d tried everything, Colley says. “This disease is usually fatal if left untreated. I thought I was done for.”

Two-drug combo

Then Raghav threw Colley a Hail Mary pass. He invited her to participate in a new clinical trial that would gauge the



Kanwal Raghav, M.D., says peritoneal mesothelioma is often mistaken for ovarian cancer, because both diseases produce the same symptoms.

effectiveness of two drugs to treat peritoneal mesothelioma. The medications would be given simultaneously to deliver a one-two punch against the disease. Bevacizumab, known commercially as Avastin, would prevent the growth of new blood vessels that feed tumors, while the immunotherapy drug atezolizumab – trade name Tecentriq – would energize the immune system and help it recognize and attack cancer.

“I want you to try this, but there are no guarantees,” Raghav cautioned Colley.

“Sign me up,” she responded. “I’m not ready to die.”

When Raghav explained that even if the drugs didn’t work for her, other patients would benefit down the line, Colley says she was sold.

“No question about it,” she says. “I had to do this.”

Colley began the two-drug combo the first week of April 2018. Today, her tumors have shrunk by 71 percent.

Raghav is elated with his patient’s progress.

“Immunotherapy, in combination with other drugs, is opening up a host of new therapeutic options for treating peritoneal mesothelioma and other rare cancers,” he says.

No standard treatments

People with rare cancers have been at a disadvantage for years, Raghav says.

“There’s a lack of tried-and-true treatments,” he explains. “Drug companies don’t have an incentive to fund studies that will help only a small number of people.”

With more common cancers like the “big four” – breast, colon, lung and prostate – scientists can recruit patients for clinical trials and determine which treatments do or don’t work. But there simply aren’t enough people with rare cancers to participate in studies that lead to valid scientific conclusions.

“We have well-established methods of treating more common cancers,” Raghav says, “but rare cancers don’t have that luxury.”

So what’s a doctor to do when a rare cancer patient seeks treatment?

“Most resort to talking with colleagues who’ve handled a similar case at another cancer center,” Raghav says, “or looking in the medical literature for an example where a patient responded well to a particular therapy.”

Raghav calls the lack of a standard method for dealing with rare cancers “concerning.”

Team science

Now, MD Anderson is launching a new effort to close this gap. The cancer center’s Rare Tumor Profiling Initiative is bringing together all faculty involved in rare tumor research and treatment, and assembling them into working groups by cancer type.

“Investigators from across the institution are invited to participate,” explains Andy Futreal, Ph.D., chair of Genomic Medicine. “Their data and their patients’ biological samples will be placed in a central repository shared by all. This is team science at its best.”

The group effort will yield enough samples to conduct robust, reliable studies, Futreal says.

“Aggregating as much information as we can about the rarest cancers will help us determine which patients should have which treatments,” Futreal says. “We’ll also identify and follow up on new ideas.”

Eventually, MD Anderson researchers will team with other academic cancer centers to broaden this effort.

“With more patients, more data and more results, pharmaceutical companies will have an incentive to fund more rare cancer studies,” Futreal says.

Increased awareness

Colley is just glad more people are talking about rare cancers – which the National Cancer Institute defines as those that occur in about 15 out of 100,000 people.

“Getting any cancer diagnosis is daunting,” she says, “but learning you have a rare cancer is particularly isolating. Not many people are going through what I am. The more awareness, the better.”

Every three weeks, Colley returns to MD Anderson for checkups. During her two-hour commute, she thinks about her dad who passed away 15 years ago. Prostate cancer caused his death, but he also had asbestosis – lung tissue scarring caused by inhaling asbestos fibers.

“He worked so hard to support his family,” she says. “I wish we’d known then what we know now.”

When the clinical trial Colley’s participating in ends next year, she expects she’ll be put on maintenance drugs for the rest of her life to keep her cancer at bay.

“That’s just fine by me,” she says.



Claire Spedale is getting stronger with help from physical therapist Alexander Penny after undergoing surgery and chemotherapy for bone cancer.

Exercise as a tool to fight cancer

Study focuses on getting back to normal activity as soon as possible

By Katrina Burton

When 14-year old Claire Spedale felt a nagging pain in her hip two years ago, she at first blamed her physical activity as a cheerleader and soccer player. But when the pain became unbearable, her mom took Claire to the pediatrician. An MRI scan revealed a suspicious mass in her pelvis.

The Spedales immediately contacted Valerae O. Lewis, M.D., chair of Orthopedic Oncology at MD Anderson. Within 24 hours, Claire and her family were at MD Anderson Children’s Cancer Hospital, where Claire received a diagnosis of Ewing’s sarcoma – a bone and/or soft tissue cancer that is most common in adolescents and young adults.

“The diagnosis was shocking to say the least,” says Claire’s mom, Jeanne Spedale, M.D. “As a dermatologist, I often see melanomas and other skin cancers, but not sarcomas. I’m grateful that we knew the right doctors with the right expertise who could guide our family to the right place for treatment.”

Claire’s treatment consisted of chemotherapy and surgery. After pre-operative chemotherapy, she underwent an internal hemipelvectomy – a surgery where a portion of the pelvic bone is removed, and in Claire’s case, reconstructed with her own fibula.

While undergoing her first three months of chemotherapy, Claire participated in a study to determine whether exercise before surgery has a positive impact on the delivery and effectiveness of chemotherapy and on how a patient is able to perform activities of daily life.

“Staying physically active was still important, which made Claire the perfect candidate for our clinical trial,” says Lewis, who co-chairs the study with Keri Schadler, Ph.D., assistant professor of Pediatric Research.

Six months of chemo followed Claire’s hemipelvectomy, and just ten months after her



Photo: Adolfo Chavez III

Orthopedic surgeon Valerae Lewis, M.D., removed the cancerous portion of Claire Spedale’s pelvic bone, then reconstructed the pelvis with a bone from Spedale’s lower leg.

The study will assess whether exercise has a positive impact on the delivery and effectiveness of chemotherapy, and on patients’ ability to perform activities of daily life.

initial diagnosis, she rang the bell signifying the end of treatment.

But Claire’s cancer journey didn’t stop there. Not long after ringing the bell, routine testing revealed an abnormality on the lobe of her thyroid gland. Claire was diagnosed with papillary thyroid carcinoma, a second cancer unrelated to her initial cancer. She didn’t have

to undergo chemo or radiation, but she did need surgery.

“As a family, we were focused on being positive throughout the process, and Claire was focused on getting back to normal as soon possible,” says Gerry Spedale, Claire’s father.

With faith, family and friends in her corner, Claire persevered. Today, she’s a sophomore at Episcopal High School in Houston where she recently made the Varsity Cheer Squad. She continues physical therapy twice a week at MD Anderson, has her own home-workout routine, and gets scans every three months. After graduation, she plans to study fashion design in college.

“I feel blessed to have support from my family, friends and school,” says Claire. “It’s great to get back to living my life.”

A double threat

Photo: Adolfo Chavez III



Vincent Bernard is working toward joint M.D. and Ph.D. degrees as a student in the Medical Scientist Training Program.

Dual degree program trains next generation of physician-scientists

By Anissa Anderson Orr

Take a closer look at MD Anderson doctors, and you'll notice many have two sets of letters after their names – M.D. and Ph.D.

That means not only did they spend four years in medical school, plus a residency and a fellowship – or two – learning to prevent, diagnose and treat disease, but they also labored in the laboratory for several additional years.

This select cadre of medical professionals that trains in both medicine and research are called physician-scientists. They bridge the gap between bench and bedside and are the driving force behind today's most promising cancer discoveries.

MD Anderson plays a key role in training physician-scientists. Since 1982, the institution has served as a training site for the Medical Scientist Training Program, a joint program of MD Anderson and The University of Texas Health Science Center at Houston (UTHealth). The program has graduated 112 students since its inception.

Students in the rigorous, seven-to-nine-year program earn a medical degree from UTHealth's McGovern Medical School and a doctorate from MD Anderson Cancer Center UTHHealth Graduate School of Biomedical Sciences (GSBS). The program also partners with the University of Puerto Rico College of Medicine, as part of a federally funded effort to train a new generation of physician-scientists from Puerto Rico.

Competitive and rigorous

Each year, 200 students apply for just a handful of spots – up to nine this year from last year's five – thanks to new funding from the National Institutes of Health. Program directors look for top students with a passion for both medicine and science.

"To get through such long and strenuous training, you really have to have that burning desire to do research, and be ready to experience all the disappointments and excitement that goes along with it," says Dianna

Milewicz, M.D., Ph.D., the program's director.

Students complete their first three years of medical school before starting their dissertation research – a unique and critical aspect of the program, says Milewicz, because students don't start evaluating patients, diagnosing problems and recommending treatment plans until their third year of medical school.

"After they've seen patients, they begin to understand how much we know, but also how little we know about how to diagnose and treat diseases," she says. "Then they go into their dissertation research with that kind of knowledge and understanding. And it allows them to be much more aligned in the area of medicine they want to go into in the future."

Before selecting a laboratory where they'll pursue their dissertation research, students test the waters with three research tutorials, choosing from more than 500 faculty with research interests spanning the entire spectrum of biomedical sciences. During their years in the lab, they also spend half a day a week in

Photo: Thomas Campbell



Maureen Aliru is planning a career as a radiation oncologist after being introduced to the field at MD Anderson.

Photo: Adolfo Chavez III



Neima Briggs says his future career as a physician-scientist in infectious disease will likely intersect with oncology, because 18 percent of cancers are related to infectious diseases.

the clinic, treating patients diagnosed with the disease they are studying.

Finding a field that fits

These hands-on learning experiences are designed to train students to be successful physician-scientists and to steer them toward their ideal field of study.

Dallas native Maureen Aliru, a graduate of Rice University with a degree in bioengineering, credits her introduction to radiation oncology at MD Anderson for cementing her interest in the field.

She's studying nanomaterials for cancer therapy in the laboratory of Sunil Krishnan, M.D. Nanoparticles are microscopic particles that

accumulate in cancer cells and enhance the effects of radiation to kill tumor cells. After graduating, Aliru plans to apply for a medical residency in radiation oncology.

"This is a field that has a lot of potential for discoveries and advancements that could provide considerable benefits for patients," she says.

Radiation oncology also captured the imagination of Vincent Bernard, a student who's currently part of the partnership with the University of Puerto Rico School of Medicine. Bernard has a degree in chemical and biomedical engineering from Johns Hopkins University.

Now a postdoctoral researcher in the laboratory of Anirban Maitra, M.B.B.S., he's working on liquid biopsies as an alternative

to needle biopsies for patients with pancreatic cancer. The technology allows clinicians to track how tumors respond to therapy in real time without the need for expensive, invasive procedures.

Bernard will soon return to Puerto Rico for his final year of medical school, where he'll complete a residency in radiation oncology.

"Being able to take a patient from what they may consider a death sentence to a cure is an incredible journey that I hope I can help my patients through," he says.

For Neima Briggs, a University of Texas at Austin honors biology graduate and Fulbright Scholar, it was the tiny, but terrible, human whipworm that seized his attention in the laboratory of MD Anderson immunology expert Jagannadha Sastry, Ph.D.

Briggs collaborated with Sastry and Peter Hotez, M.D., Ph.D., dean of the National School of Tropical Medicine and director of Texas Children's Hospital's Center for Vaccine Development, to identify and evaluate vaccine candidates against the common intestinal parasite, which causes malnutrition and inflammatory bowel disease in an estimated billion people worldwide.

"I believe my future work as a physician-scientist in infectious disease will intersect with oncology," says Briggs. "About 18 percent of cancers are related to infectious diseases."

He finished his medical degree in May and will now complete a Physician-Scientist Training Program that integrates an internal medicine residency with an infectious disease fellowship.

Future cancer fighters

Having established connections at MD Anderson, many graduates launch their careers at the cancer center. In this way, the physician-scientist program acts as a pipeline for top talent.

Notable alumni include endometrial cancer expert Russell Broaddus, M.D., Ph.D.; Faye Johnson, M.D., Ph.D., who's advancing therapies for head and neck and lung cancers; and Michael Davies, M.D., Ph.D., who leads the Melanoma Moon Shot program.

Today's M.D./Ph.D. students will grow into tomorrow's cancer fighters, says Medical Scientist Training Program co-director George Calin, M.D., Ph.D., professor of Experimental Therapeutics at MD Anderson.

"Clinicians who have strong research training will better understand the mechanisms of cancer," Calin says, "and therefore have a better chance to develop new treatments. They will contribute to the discoveries of the next decade."



Rice University premedical student Joshua Anil visits patients in their rooms, offering conversation and support on their road to recovery.

College student volunteers enhance the patient experience

MD Anderson connections with university organizations provide young adults opportunities to learn through experience

By Ina Fried

When he visits patients at MD Anderson, Joshua Anil is sometimes surprised by their strong reactions.

In his year and a half as a trained MD Anderson volunteer, Anil previously worked on the Hat Cart, offering complimentary baseball caps, scarves, hats and turbans to patients undergoing chemotherapy, and now he visits with thoracic surgery patients in their rooms, making conversation and offering complimentary toiletries and magazines.

“Some patients don’t want hats, some patients don’t even want to talk, but they will just be so moved and will almost cry that someone is coming to talk to them. The fact that they are so grateful and so happy that MD Anderson cares this much

has been amazing,” says Anil, a 19-year-old Rice University sophomore from Dallas.

Before he began volunteering, Anil says he knew of MD Anderson’s rating as the best cancer hospital in the United States for cancer care. “But seeing how much effort goes into every detail of care, and how dedicated everybody is to making sure patients have the best experience possible so they’ll have the best possible recovery, has been really amazing.”

About 25 percent of MD Anderson’s on-site volunteers are college students. They’re part of a diverse group of more than 1,000 on-site trained volunteers who enhance the patient experience by providing comfort, hope, support and education.

“Our program is very structured because we have so many volunteers and so many different patient needs,” says



Christian Alcaron, right, a student volunteer from the University of Houston, says his main goal is to get kids out of bed, moving, and having fun.



MD Anderson beauty shop volunteer Yicenia Aviles helps patients try on wigs and scarves. She’s preparing for a career as a laboratory technologist in MD Anderson’s School of Health Professions.

Mary Donnelly Jackson, a director in Volunteer Services and Merchandising who leads volunteer recruitment, onboarding, education and myCancerConnection, a unique cancer support community that offers one-on-one support by connecting cancer patients, survivors and caregivers.

After completing a questionnaire about their interests on MD Anderson’s website, volunteers go through multiple interviews, orientation and one-on-one training to be sure that the person and the assigned position are a good match. College student assignments are designed for a one-semester

commitment with onboarding at the end of the previous semester. A specific orientation for college students focuses on appropriate positions and allows them to meet students from other schools.

“We’ve always had individual college students as volunteers,” Jackson says, “but now we’re trying to work through organizations on campus.”

At Rice, for example, Anil serves as the liaison between MD Anderson and the Rice Premedical Society, where he is vice president. He arranged for a Volunteer Services and Merchandising staff member to attend the first general meeting of the fall semester and to make a presentation about opportunities. A hospital tour allows students to see volunteering first-hand.

Anil, who hopes to become a pediatric oncologist, says, “Being exposed to so many patients helps me get a better understanding of what the process is like and how as a future health care professional, I can better support these patients on their road to recovery.”

At the University of St. Thomas (UST), members of Tri Beta, the biological national honor society, are particularly interested in the opportunity to fulfill their organization’s community service obligations. When Volunteer Services and Merchandising identified that volunteer positions on Friday afternoons and evenings were difficult to fill, the students at UST filled the slots.

At UST, volunteering gives students a connection to resources, mentors, networks, and social and professional development.

“Having this opportunity opens the doors for them and gives them confidence in their schoolwork and their ability to do other things outside of school,” says Edward Nam, Ph.D., assistant professor of Biology and Tri Beta advisor at UST. “The more connections being made, the brighter their future.”

One doctor, her research and her patient's cats

By Claudia Feldman

Early on, their bond had nothing to do with cats.

Instead, they were 30-some-things joined in their determination to beat acute myeloid leukemia.

Caroline was the patient, an English mom desperate to see her 3-year-old son grow up.

Katy Rezvani was her transplant doctor at the Hammersmith Hospital in London, passionate about her patients and convinced their immune systems could be harnessed to fight cancer.

But at the time, in 2009, Rezvani could only offer Caroline a stem cell transplant, then another, and then another.

When Caroline was near death in the fall of 2011, she asked Rezvani if she knew anyone who would adopt her two cats. They had to go together, Caroline said. She couldn't stand to see them separated.

The next weekend, Rezvani and her husband picked up the sisters, Roxy and Bella, and brought them to their new home. The beautiful felines offered consolation and even inspiration after Caroline died in early 2012. Rezvani knew it wasn't the cancer or the stem cell transplants that had killed her patient, but complications from hemorrhagic cystitis associated with the BK virus, an occasional side effect of the transplants.

Rezvani, who was born in Iran, and who escaped to England with her family after the revolution that saw the Shah's fall, is an M.D. and Ph.D. who trained in London and Washington. She understood the challenge before her. To save future Carolines — to make stem cell transplants safer and more effective — she would have to target and eliminate the BK virus.

Rezvani might have spent the rest of her career in research labs and hospital rooms in London, her adopted home. But in the spring of 2012, she, her husband Richard and their little family — both cats had their own European Union passports — moved to Houston. Scientists at MD Anderson had admired Rezvani's work and recruited her to continue her immunotherapy research there.

As Rezvani met her new patients, she saw many more with the hemorrhagic cystitis, and that made her even more determined to try to help them. By 2014, she had trained T cells — in the simplest terms they are like soldiers that can destroy specific invaders —



Courtesy photo

Animal lover and transplant physician Katy Rezvani, M.D., Ph.D., adopted two cats, Bella and Roxy (not shown), from a terminally ill patient in 2011. Two years ago, she rescued a poodle, Tricky-Wu.

to attack the BK virus. And, importantly, she was ready to infuse those special cells into patients in a clinical trial. Today, more than 60 hemorrhagic cystitis patients who received the T cells have been able to leave the hospital. They still have the virus, Rezvani says, but are symptom-free.

Rezvani is thrilled with those results, but that's not the end of her story.

"At least one of the complications of stem cell transplants is manageable now, but there are so many other things to work on," Rezvani says. "One example is the JC virus."

Also known as the John Cunningham virus, it's a germ so common that most adults have been exposed to it with no ill effects. For those with weakened immune systems, however, it can lead to an often fatal brain disease known as progressive multifocal leukoencephalopathy, or PML.

Rezvani says the two viruses — BK and JC — are similar in structure and that the T cells that fight the BK virus appear to be effective against the JC virus as well.

"It's too early to tell because we have only treated three JC patients, but I can confirm success with them," she says.

If Rezvani's T cells continue to help PML patients, who may have cancer, HIV or an autoimmune disease, it will be cause for celebration.

"There's not been anything for them until now," Rezvani says.

Patrick Hwu, M.D., head of the Cancer Medicine division at MD Anderson, is inspired by Rezvani's work, and he knows how Caroline, her patient from long ago, affected her.

"Katy not only adopted her patient's cats," Hwu says, "but she developed a highly effective immunotherapy in her patient's honor. And she's helping others to not perish from the devastating complications of transplantation. I think she's the story of the year."

During Hurricane Harvey, Rezvani was one of the MD Anderson physicians who made her way to the hospital during the storm and stayed for days watching over her patients — until the danger passed.

Today, Rezvani is hard at work on other innovative ways to treat cancer, including the aggressive brain tumor known as glioblastoma.

"I'm hoping to start clinical trials with glioblastoma patients in about a year," she says. "I'm optimistic."

When Rezvani is not working, she's at home with Richard, their rescued poodle Tricky-Wu, and Bella and Roxy, who are now both 15.

"They love Texas," she says. "They love the heat. And Bella is a little huntress. She's like a kitten still."

In 2013, Rezvani went back to London and brought photos to Caroline's family.

"I wanted to show her little boy pictures of the cats," she says.

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MD Anderson also collaborates with community hospitals and health systems nationwide through MD Anderson Cancer Network. 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. The institution also has developed a network of national and international locations.

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