



# DIVISION OF SURGERY

A LOOK AT PROCEDURE VOLUMES, QUALITY INITIATIVES, RESEARCH AND EDUCATION | FY 2018

THE UNIVERSITY OF TEXAS  
**MDAnderson**  
**Cancer Center**

Making Cancer History®



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## LETTER FROM THE DIVISION HEAD

The mission of the Division of Surgery is to advance oncologic surgery in the nation and the world through safe, high-quality, multidisciplinary patient care, research and education. In the pages that follow we'll demonstrate the breadth of cancer care provided by each of our nine departments. Through innovation and the dedication of our providers, we have simultaneously achieved exceptionally low mortality rates and high clinical volumes.

This publication contains detailed data on our surgical outcomes and volumes from each of our nine departments. In each department's section, you will learn about the care provided, the care providers, innovative procedures, and hear from a patient about his or her cancer journey.

Each section of this report also profiles researchers who are changing cancer care paradigms, like the Melanoma Moon Shot, which is discovering immune therapies for melanoma, as well as ways to decrease tanning bed use across the globe. Our surgeon-scientists and co-investigators in their respective labs are also studying areas such as genetic and targeted cancer therapies, the microenvironment of tumors and the development of novel flaps for tissue reconstruction, to name a few. Many are leading the way in advancing national trends, like precision medicine and eliminating opioid addiction.

Our vision is to be the most transformative oncologic surgery program in the world. To do so, we are expanding our network and providing advanced surgical care in multiple Houston-area locations, including League City, West Houston, Memorial City, Sugar Land and The Woodlands, and with national partners in Arizona, Florida, New Jersey, California and other locations.

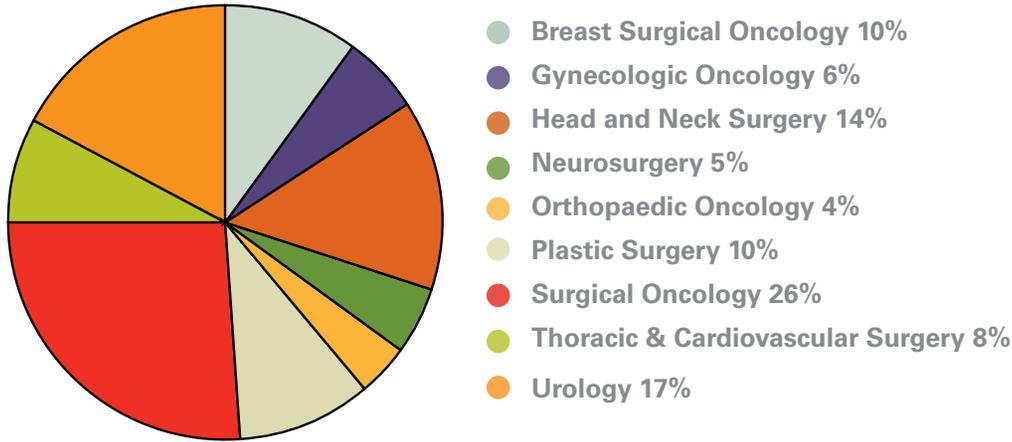
Surgical care of cancer patients can be challenging for all involved. With this report, we renew our commitment to our partners and patients to provide the most compassionate and expert care possible. We hope you find the pages that follow as interesting, informative and inspiring as we do.

Stephen Swisher, M.D. Head, Division of Surgery

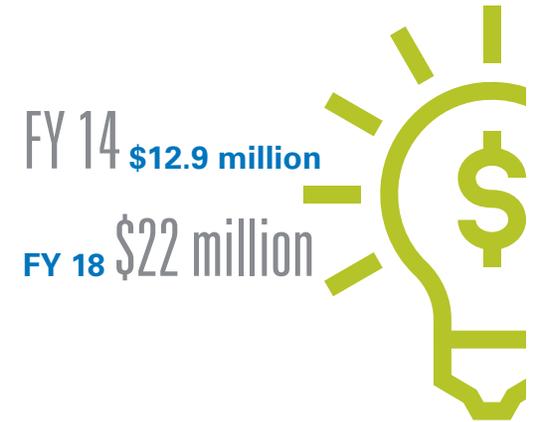


# BY THE NUMBERS

FY18 cases by service



Research funding activity



FY18 active grants



11,459 outpatient surgeries in FY18

FY18 total surgery hours 71,462

## BRINGING INNOVATION TO THE OR

At MD Anderson, our surgeons are known for making procedures once deemed impossible, possible, helping our patients celebrate birthdays they wondered if they'd ever see or experience a quality a life they thought they could only dream of.

In summer 2017, Jesse Selber, professor of Plastic Surgery, led a team of five plastic surgeons in performing a news-making twin tissue transplant. The patient, Marian Fields, had been struggling with an undiagnosed cancer for years. When she finally came to MD Anderson, she was diagnosed with plexiform fibrohistiocytic sarcoma, an aggressive skin cancer so rare that only about 150 cases have been confirmed in the US since 1980. When Selber met with Marian, he explained that the tumor couldn't be removed only because Marian didn't have enough tissue to close the wound completely. That's when Marian's twin sister Mary Jane came to the rescue. Without hesitation, Mary Jane volunteered to donate her own tissue to Marian. In a 14-hour surgery, surgeons removed a section of flesh — 21.5 inches by 8.5 inches and 2 inches deep — from Mary Jane's abdomen, stitched it closed in a large tummy-tuck and transferred it to Marian's back after the tumor was removed by connecting eight different arteries and veins.

"It's probably the largest free tissue transfer I've ever seen, and the most extensive twin transplant that's ever been done," says Selber, who just a few years before led a team of surgeons in the first-ever scalp transplant.

Both surgeries were made possible by a technique called microsurgery, a type of robotic surgery in which surgeons reconnect very small blocked vessels, nerves and lymphatic vessels with tiny stitches — some thinner than a hair and difficult to see with the human eye. It's just one type of new technology and innovation we've embraced.

Over the past 10 years, our surgeons have performed more than 7,000 robotic surgeries and microsurgeries, using Da Vinci robots. Equipped with miniature surgical tools and 3-D cameras with magnification of the operative view, the five robots allow our skilled surgeons to operate with

extreme precision through tiny incisions.

To ensure our patients receive the best robotic surgery possible, our surgeons receive extensive robotic surgery training. Training and approval is required to use robotic tools. We rank second in efficiency among top cancer centers in the country, with approximately 325 cases per robot each year.

"Even with the complexity of surgery required for our patients' diagnoses, we do more cases per robot than most hospitals, and our program is still growing," says George Chang, M.D., professor of Surgical Oncology.

We sponsor multiple initiatives to help bolster the use of robotic surgery and technology within the division, including an innovation subcommittee and MINTOS. MD Anderson established the MINTOS — Minimally Invasive New Technology in Oncology Surgery program — 11 years ago. In MINTOS, we implemented a robotics curriculum for both fellows and faculty so they can strengthen their experience and expertise.

Some areas in which our surgeons conduct robotic surgery in include:

- **Head and Neck Surgery:** Transoral robotic operations, a minimally invasive approach, is a significant change since traditional surgeries for human papillomavirus (HPV)-associated oropharyngeal cancers require opening the jaw.
- **Plastic Surgery:** All MD Anderson plastic surgeons are trained microsurgers. In addition to performing reconstructive surgery, our plastic surgeons can help patients overcome lymphedema, a debilitating and common cancer treatment side effect in which the lymph nodes fail to move fluid throughout the lymphatic system properly. Fluid builds up causing swelling and pain. Our plastic surgeons can perform two surgeries to ease lymphedema. The first is a lymphatic bypass surgery in which surgeons disconnect and reconnect the lymph nodes so fluid moves properly.



MD Anderson urologic surgeons are skilled at nerve-sparing techniques designed to help men keep urinary and sexual function.

- The second is the lymphatic transfer in which surgeons take lymph nodes from other parts of the body and use them to fix the spot where the lymphatic system is clogged, like a plumber replacing pipes. This allows the patient's lymphatic system to drain fluid. While the procedure can't completely reverse lymphedema, nearly 100% of patients saw a positive change.
- Rectal cancer: Robotics are enabling surgeons to perform surgery on complex cases of rectal cancer traditionally treated by an open surgical approach. As a result, patients experience improved recovery and a quicker return to their normal routines or to their next phases of multidisciplinary treatment.
- Thoracic: Nearly 70% of lobectomies – surgically removing a lobe of the lung to treat lung cancer – at MD Anderson are performed robotically. This allows our patients to experience shorter hospital stays and lower side effects.
- Urology: The most common procedure is a robotic prostatectomy for prostate cancer. MD Anderson urologic surgeons are skilled at nerve-sparing techniques that may help men keep urinary and sexual function. Robotic prostatectomy results in fewer complications and less blood loss and urinary tract scarring.

Urologic surgeons also are able to perform robotic retroperitoneal lymphadenectomy with equal quality as open surgery. This procedure removes retroperitoneal lymph nodes in patients with testicular cancer. A robotic approach is advantageous for patients because it reduces hospital length of stay and postoperative pain.

# BUILDING THE NEXT GENERATION OF ONCOLOGY SURGEONS

**S**urgery supports 16 surgical fellowships at MD Anderson, which have graduated nearly 1,000 skilled surgeons. The following fellowships are offered through our departments:

**Breast Surgical Oncology:** In 2002, MD Anderson created a multidisciplinary Breast Surgical Oncology fellowship directed by Henry Kuerer, M.D., Ph.D., professor of Breast Surgical Oncology. Since the commencement of this internationally renowned training program, over 50 graduates have matriculated, and Mediget Teshome, M.D., became the associate program director in 2015.

The program admits four top trainees per year, making it the largest of 55 programs in the nation. It is one of the most sought after training programs, with an average of 85 applicants per year.

**Clinical Fellowship in Microvascular Reconstructive Surgery:** Run by Plastic Surgery, this one-year fellowship exposes nine trainees to a range of ablative and reconstructive surgeries for cancer patients. Matthew Hanasono, M.D., professor of Plastic Surgery, is the director of the program, which graduated 168 fellows since 1988.

**Gynecologic Oncology Fellowship:** The four-year fellowship in Gynecologic Oncology is an ACGME approved fellowship and the largest such program in the United States. Since its inception in the 1950s, it has graduated 179 fellows. Michael Frumovitz, M.D., professor of Gynecologic Oncology and Reproductive Medicine, directs the program. The department has a T32 grant from the National Cancer Institute (NCI) to support the research and training during the first two years of the fellowship, which is completed by three fellows each year. The department also has the **Felix Rutledge Fellowship**, a one-month elective rotation for third-year obstetrics and gynecology residents.

**Musculoskeletal Oncology Fellowship:** Directed by Valerae O. Lewis, M.D., this fellowship allows fellows to train in the multidisciplinary care of benign and malignant soft tissue and bone tumors. Two fellows per year are accepted for the fellowship, which lasts one or two years. The first year

focuses on clinical work and the optional second year is primarily research. Since 1999, 34 fellows have graduated from the program. Orthopaedic Oncology also sponsors the annual MD Anderson Musculoskeletal Pathology Course. This national course provides an in-depth review of musculoskeletal diagnoses and treatment options.

**Neurosurgical Oncology Fellowship:** Shaan Raza, M.D., assistant professor of Neurosurgery, directs the country's largest neurosurgical oncology fellowship. More than 80 fellows have completed the program since 1991. Fellows are exposed to a variety of cases and have access to the Microsurgical and Endoscopic Center for Clinical Applications (MECCA) Laboratory. This state-of-the-art lab contains OR-caliber equipment and has hosted 49 courses since it opened in January 2012.

**Surgical Oncology Fellowships:** Our Surgical Oncology department has numerous exceptional fellowships. Its hallmark Complex General Surgical Oncology Fellowship is a two- to three-year program and hosts seven new fellows each year. It is directed by Elizabeth Grubbs, M.D., associate professor of Surgical Oncology, and has graduated 264 fellows since 1989. The Hepato-Pancreato-Biliary Surgery Fellowship launched in 2013 and is directed by Thomas Aloia, M.D., associate professor of Surgical Oncology, and has six graduates to date; the Surgical Endocrinology Fellowship is directed by Nancy Perrier, M.D., professor of Surgical Oncology, and has 11 graduates since its inception in 2009; and four fellows have completed the new International Surgical Oncology Fellowship, also directed by Aloia, and established in 2013.

The department also has a grant to train eight academic surgical oncologists each year in cancer research. Finally, it has surgery residents from six Houston programs who rotate through its services each year and medical students who rotate through monthly.

**Thoracic Surgery Fellowship:** The Thoracic Surgery fellowship is a collaboration between MD Anderson and the University of Texas-Health Science Center at Houston. The



MD Anderson is dedicated to training the next generation of oncology surgeons through our many Surgery fellowship programs.

program provides a balanced education in the treatment of cardiovascular, esophageal, pulmonary and other thoracic diseases. The fellowship is a two-year curriculum with two training tracks — general thoracic surgery and cardiothoracic surgery. We are currently approved to train one individual in each track per year. It is one of the most competitive training programs in the country, attracting up to three-quarters of the nation's applicants each year. It has had 20 graduates.

**Urologic Oncology Fellowship Program:** Started in the late 1960s, this program hosts 10 fellows for a one-year research assignment and a one-year clinical rotation.

The program, directed by Brian F. Chapin, M.D., associate professor in Urology, is among the largest in the country and the first to be recognized by the Society of Urologic Oncology. The fellowship has had 92 graduates. Urology also offers a Urinary Tract and **Pelvic Reconstruction Fellowship**, directed by O. Lenaine Westney, M.D., professor of Urology, for one trainee each year in a one- to two-year clinical rotation. Nine fellows have graduated since 2006 when the program began.

Urology surgeons are leaders in minimally invasive surgery training for the Division of Surgery. Surena Matin, M.D., professor of Urology, leads the **Minimally Invasive**

**New Technology in Oncologic Surgery program**, and John Davis, M.D., professor of Urology, oversees **robotic prostatectomy training**.

## RESEARCH IN THE LAB AND THE OPERATING ROOM

Much of the research done by our surgeon scientists involves studying what goes on inside the operating room, as well as what treatment patients undergo outside of it.

### Comparing surgical techniques

Pedro Ramirez, M.D., and Jose Rauh-Hain, M.D., two gynecologic oncologists, made headlines in late 2018 when they each published studies on cervical cancer treatment. Both studies showed that minimally invasive hysterectomies – the standard of care for treating early stage cervical cancer – were actually less effective than the traditional type of treatment: an open hysterectomy.

The results stunned patients and surgeons alike, and led to changes in the way surgeons at MD Anderson treat patients.

“This is why we are committed to randomized Phase III surgery trials for gynecologic cancers,” says Karen Lu, M.D., professor and chair of Gynecologic Oncology and Reproductive Medicine. “We need to test the standards of care to confirm that they really are the best ways to treat our patients.”

### Right procedure, right patient, right time

Meanwhile, other surgeon scientists aren’t looking at what happens in the operating room. They’re looking at what happens before or after patients undergo surgery and how that influences outcomes.

In July 2017, Matthew Katz, M.D., associate professor of Surgical Oncology, launched a national study measuring surgical outcomes for patients having pancreas resections. He and his team compared patients who had preoperative chemotherapy to patients who had chemotherapy and radiation therapy before surgery.

“By and large, the improvement isn’t going to be found in doing the actual operation,” Katz says. “We’re asking, ‘can we make outcomes even better by looking

at what happens before and after surgery. Can we use chemotherapy before the surgery, or a combination of chemotherapy and radiation before the surgery, for example, to help our patients?’”

Some studies look at the success of surgery used in combination with newer therapies, like immunotherapy, a type of therapy in which the immune system is built up to fight the cancer cells. Others look at the effects of things like diet or exercise on surgery.

Katz led one such trial. Patients in the study exercised moderately up to 30 minutes a day, five days a week and strength trained two days a week. Their fitness levels were then tested up to seven months after surgery to see if their overall fitness and quality of life improved.

The combination of safer, more effective surgical techniques coupled with improving care before and after surgery is having positive results, illustrated in how MD Anderson’s pancreatic cancer patients’ outcomes compare to those nationally.

At MD Anderson, the mortality rate within 90 days of surgery is essentially 0% of patients and the length of hospital stay is six days. Compare that with the national averages, in which surgery-related death is about 8% and the post-surgical hospital stay is more than 10 days.

Overall, MD Anderson patients with pancreatic cancer have a median survival rate of more than 43 months – more than twice as long as the medical survival for patients in the US, which is less than 20 months.

Katz says: “It’s all about finding the right procedure for the right patient at the right time.”

### Lab-based research still plays an important role in surgery

Lab-based research still plays an important role in the research done by surgeons. Surgeons are increasingly offering novel complex surgeries and doing so with strong



Pedro Ramirez, M.D., conducted a study that helped show that minimally invasive radical hysterectomies — a standard of care for treating early stage cervical cancer — are actually less effective than the traditional type of treatment: an open hysterectomy.

biological evidence gained through translational research will only improve our patient outcomes.

Summer Hanson, M.D., assistant professor and director of translational research in Plastic Surgery, has been studying how stem cells taken from different kinds of fat can be used to help patients heal better.

“It turns out there’s a lot more to fat than we originally thought,” Hanson says.

While we typically think of all fat as bad or unhealthy, researchers have found that certain fat cells in the body are healthier than others. Now, Hanson and her team

are studying these fat cells to determine if they can help patients’ wounds heal more quickly and improve skin quality.

“It’s not enough just to remove the cancer,” Hanson says. “We have to make sure we’re giving our patients the best possible quality of life.”

## PREVENTING CANCER IN HIGH-RISK PATIENTS

About 5% of people who develop colorectal cancer have an inherited gene that caused them to develop the disease. That number goes up to 16% when applied to colorectal cancer patients younger than age 50.

For these patients and others with a genetic risk of developing gastrointestinal cancers, the standard treatments aren't enough. They may need different types of surgeries and other treatments to lower the risk of recurrence. They may need other preventative surgeries, like hysterectomies. They may need genetic counseling. Coordinating all that can be difficult, especially for someone coping with the shock of a cancer diagnosis.

### Personalized care

At MD Anderson, we bring together all those services through our Familial High-risk Gastrointestinal Cancer Clinic. Under the guidance of medical director and colorectal cancer surgeon, Nancy You, M.D., an associate professor of Surgical Oncology, the center links patients with an increased genetic risk of developing cancer like Lynch syndrome and Familial Adenomatous Polyposis to the specific services they need, whether it's genetic counseling, genetic testing, radiation oncology, general oncology or a prophylactic surgery.

It's a part of a growing trend in what's called precision medicine – the idea that when it comes to treatment one size doesn't fit all. Instead, our care teams consider the variability in patients' genes, environment and lifestyle in order to determine the treatment that's best for them.

Even the surgeries themselves are tailored to each specific patient.

"If we're taking out part of the colon, we help ensure that the patient doesn't have a recurrence, since we know the risk of this is higher with a genetic condition," You says.

### Responding to increasing colorectal cancer rates

Colorectal cancer rates are rising in younger patients. According to an MD Anderson study, by 2030 it's estimated that colon and rectal cancers are expected to increase by 90% and 124.2% in patients ages 20 to 34. For those ages 35 to 49, the predicted increase will be 27.7% for colon cancer and 46% for rectal cancer.

MD Anderson has become a leader in treating young colorectal cancer patients. Here, nearly half of our colorectal cancer patients are 50 or younger.

"We can connect them to services that are paramount to young cancer patients, like oncofertility specialists or social work," You says.

Since its launch in 2011, the clinic has grown. In fiscal year 2018, the clinic treated its 500th patient.

"These patients are born into this," You says. "The Familial High-risk Gastrointestinal Cancer Clinic is uniquely equipped to provide them with the best possible care thanks to our multidisciplinary approach."

## BUILDING ON SUCCESS: A LOOK AT UPDATES TO OUR ERAS PROGRAM

Since 2013, our Enhanced Recovery After Surgery Program has improved outcomes and overall quality of life for thousands of patients. This initiative has relied on evidence-based practice and innovative research to transform the patient experience. Whereas before, patients often associated surgery during cancer treatment with long hospital stays and difficult recoveries, thanks to the ERAS program, patients are now experiencing less pain, shorter hospital stays and shorter recovering periods. In short, they're able to get back to their everyday lives more quickly than ever before.

The initiative is a joint and ongoing effort between Surgery and Anesthesiology and Critical Care that leans on implementing protocols based on evidence for four principles of care: avoiding long periods of fasting, reducing patient anxiety through education and expectation setting, minimizing narcotic use and using goal-directed fluid therapy.

"There is no other dynamic innovation in medicine that has achieved such positive outcomes with zero toxicity," says Thomas Aloia, M.D., associate professor of Surgical Oncology and head of MD Anderson's Institute for Cancer Care Innovation.

In FY18, the ERAS program allowed for a more than a 60% opioid use reduction among six surgical teams: gynecology, thoracic, liver, spine, pancreas and bladder. It also led to a decrease in length of stay within the inpatient setting by 2.5 days.

Since its inception, ERAS has been rolled out through 11 surgical service lines with plans to launch seven more in FY19 in both our Texas Medical Center campus and our Houston area locations. And our surgeons continue to conduct more research in this area to bring further improvements to our patients. In the past five years, more than 45 publications regarding ERAS have come from MD Anderson's surgery teams.

"Enhanced Recovery Programs and the resulting multidisciplinary patient-centric, recovery-focused initiatives at MD Anderson have demonstrated the value of team-science and team-based care," says Carin A. Hagberg, chief academic officer and head of Anesthesiology, Critical Care and Pain Medicine. "While initially started in surgical service lines, these principles are now being successfully implemented in non-surgical patients as well. I am proud of our team leaders in Anesthesiology and Surgery and all the team members who are collectively working for our patients."

## SURGERY IN OUR HOUSTON-AREA LOCATIONS

For years, Cheryl Ratliff had her yearly mammogram at MD Anderson Cancer Center in the Texas Medical Center. Then, her family moved to the Houston suburbs. But in 2017, when her mammogram showed a solid spot, a sign of breast cancer, she knew exactly where she wanted to go. She scheduled an appointment at MD Anderson in Sugar Land, where she knew she could get the same expertise, but this time it was closer to home.

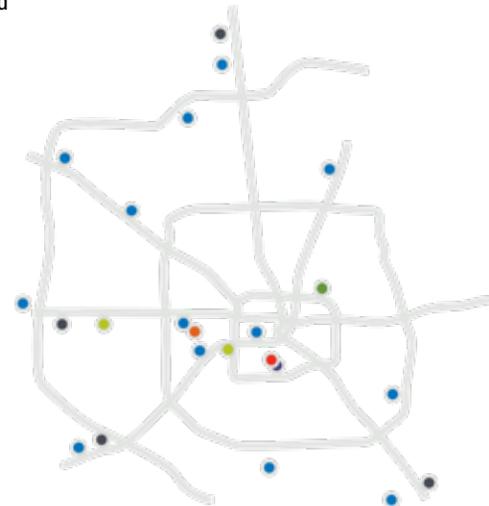
Cheryl underwent chemotherapy and surgery to have the tumor removed and her breast reconstructed – all in Sugar Land.

“Everything just came together,” she says.

Over the past five years, our presence has grown in each of our Houston-area locations. Our mission is to provide world-class cancer care by providing the right treatment to the right patient at the right time. And we can do that by seeing our patients in the right location. For many, that means a location closer to home in the Houston suburbs.

All nine of our specialty areas within Surgery have a presence in our Houston-area locations. While many of our surgeries are performed at our Texas Medical Center location, our faculty do see and screen patients in our suburban locations.

In FY 2018, we performed 1,373 surgeries in our Houston-area locations, and each year our presence in the Houston-area locations grows to better serve our patients.



- Houston reach
- MD Anderson locations**
- Houston-area care centers
  - Texas Medical Center (including Proton Therapy Center)
  - Diagnostic imaging clinics
  - Memorial City (surgery)
  - The Woman's Hospital
- Collaborative relationships**
- MD Anderson Breast Care with Memorial Hermann
  - Lyndon B. Johnson Hospital in Harris Health System (cancer care)

# BREAST SURGICAL ONCOLOGY

*Kelly L. M.D.  
SurgOncology*

Kelly Hunt, M.D.  
Department chair

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Faculty and staff in Breast Surgical Oncology collaborate closely with colleagues in Breast Medical Oncology, Breast Pathology, Breast Radiation Oncology, Diagnostic Radiology, Genetics, Cancer Prevention and Screening, and Plastic and Reconstructive Surgery.

“We have a unique, multi-team clinic in the Breast Center. Instead of seeing a medical oncologist one day, radiation oncologist the next day and surgeon the day after that, a patient meets the entire care team on the same day to develop a personalized treatment plan,” says Kelly Hunt, M.D., chair of Breast Surgical Oncology.

“This approach shortens the time it takes to get a patient’s care plan in place and started by almost 30%,” Hunt says. “It also helps identify patients for clinical trials or research studies that test new treatments.” The multi-team clinic has a 64% greater rate of clinical trial participation than standard clinical practices where patients see multiple doctors on different days.

Breast Surgical Oncology has 21 surgeons who provide exceptional surgical care for patients with breast cancer and other diseases of the breast. Last year, they saw 3,461 new patients and consults, and performed 2,997 operations in the Nellie B. Connally Breast Center and at MD Anderson in League City, West Houston, Memorial City, Sugar Land and The Woodlands. The team performs multiple procedures including:

- Mastectomy, including skin-sparing and nipple-sparing
- Tissue-sparing breast surgery, including partial mastectomy and oncoplastic reconstruction
- Axillary lymph node assessment, including sentinel lymph node biopsy techniques and targeted axillary dissection

## Limiting side effects through surgery

Our surgeons are helping our patients get back to living longer, healthier lives by employing surgical techniques that limit side effects. Some of these techniques include:

**Sentinel lymph node surgery:** Our surgeons were among the first to utilize sentinel lymph node surgery as an alternative to axillary lymph node assessment. While essential for care, traditional more extensive axillary surgery can cause lymphedema, a debilitating condition that includes arm swelling. Axillary lymph node surgery can also lead to numbness and nerve damage. Sentinel lymph node surgery is a less invasive procedure that aims to remove the first few nodes that accept lymphatic drainage from the primary breast tumor.

“Sentinel node surgery provides accurate staging and focuses on the nodes most likely to contain metastatic disease from the primary tumor. This limits the surgery to what needs to be removed and leaves other uninvolved (healthy nodes) intact,” Hunt says. “This improves a patient’s quality of life because we are minimizing side effects like lymphedema.”

**Skin- and nipple-sparing mastectomy:** During this type of mastectomy, the surgeon removes the breast tumor and mammary gland while saving the breast skin, nipple and areola (darker skin around the nipple). For eligible patients, this technique facilitates reconstruction with improved cosmetic outcomes.

**Minimally invasive approaches:** The breast surgical team is also leading in minimally invasive approaches for localizing small breast tumors and lymph nodes. They have used radioactive seed localization for breast lesions too small to be seen or felt during surgery and for localizing small deposits of metastatic disease in the axillary lymph nodes.

With these techniques, a radiologist places a tiny radioactive seed in the abnormal breast tissue or lymph node usually on a day prior to surgery. In the operating

## Finding confidence in MD Anderson

By Craig Carson

After five months of chemotherapy, a double mastectomy and breast reconstruction surgery near her home in Florida, Maria Doherty was still experiencing complications related to breast cancer. She was diagnosed with triple-negative, ER positive and HER2 positive breast cancers in 2017, and now she and her husband were beginning to feel worried and desperate.

Her local oncologist recommended she seek another opinion at MD Anderson. Here, Maria met with Joanna Lee, M.D., assistant professor of Breast Surgical Oncology, who helped her feel at ease.

“After meeting the doctors who would be helping me, my confidence started to grow. I knew I was at the best place, but then it started to feel like I was at the right place,” she says.

Lee recommended a takedown of her previous reconstruction to determine if the cancer was still spreading. On May 14, 2018, Lee worked together with Dalliah Black, M.D., an associate professor of Surgical Oncology, and David Adelman, M.D., associate professor of Plastic Surgery, to undo her reconstruction and perform a mastectomy and sentinel lymph node biopsy on her left breast. During the surgery, they removed 14 cancerous lymph nodes and determined a correct diagnosis: triple negative breast cancer.

With the right diagnosis and staging, Maria could continue with the right treatment.

“Dr. Lee saved my life,” Maria says. “The doctors at MD Anderson are amazing, and I feel like I want to shout that from the mountain tops.”



room, the surgeon uses a probe to locate the seed and target the removal of the abnormal tissue, leaving normal tissue intact. The group is now embracing newer technologies for localizing breast lesions and lymph nodes that do not require radioactive sources.

“With breast cancer survival rates getting better and better, our work is moving beyond extensive surgical procedures to developing surgical techniques that improve the general well-being of the patient after surgery,” Hunt says.

## Researching less invasive surgical techniques

Our researchers are constantly seeking new and better ways to treat breast cancer.

Hunt is leading research on less invasive surgical approaches to breast cancer.

“It has been hard for physicians and patients to accept that you’re going to do something less radical and still get the same results,” Hunt says.

Hunt was part of a national trial that published results of a study on de-escalation of axillary surgery in almost 900 patients with early (stage II) breast cancer. This Phase III trial enrolled patients who had breast-conserving therapy (lumpectomy with radiation) and positive sentinel lymph node biopsy. The patients were divided into two groups. Group 1 would complete axillary lymph node dissection, while Group 2 would have no further axillary treatment.

Recently the 10 year survival outcomes were published and results showed no significant difference in survival between women undergoing sentinel node surgery alone versus complete axillary node dissection. The study concluded that, in this patient group, removing the rest of the axillary lymph nodes doesn’t improve survival, but it can increase morbidity.

Abigail Caudle, M.D., associate professor of Breast Surgical Oncology, and her team have also contributed to

de-escalation of axillary surgery for patients who are diagnosed with positive lymph nodes but are scheduled to receive chemotherapy before surgery. Using a technique pioneered at MD Anderson called targeted axillary dissection (TAD), these patients are able to avoid more extensive surgeries and the lymphedema that sometimes accompanies the more extensive procedures.

Henry Kuerer, M.D., Ph.D., professor of Breast Surgical Oncology, is involved in an ongoing clinical trial that has demonstrated that some patients may be able to avoid breast surgery altogether when their tumor responds favorably to chemotherapy and targeted treatments. His study utilizes image-guided biopsies to collect samples following chemotherapy treatment that can verify the absence of residual breast cancer in these exceptional responders to therapy.

Hunt, Kuerer and colleagues helped to develop the American College of Surgeons ACOSOG Z1071 trial. This NCI-sponsored multicenter trial has led to the development of standards for performance of sentinel lymph node surgery after neoadjuvant chemotherapy in patients who are initially diagnosed with node-positive disease and have a good response to therapy.

“You can do less surgery and have the same cancer outcomes when you consider tumor biology and targeted treatments. This has caused a change of practice across the world, and now we’re looking at the same paradigm in women with advanced breast cancer,” Hunt says.

## Predicting recurrence, improving treatment planning, and overcoming resistance

Predicting recurrence, improving treatment planning, and overcoming resistance to therapy are also key research initiatives for the department.

Anthony Lucci, M.D., professor, and Carolyn Hall, Ph.D., associate professor of Breast Surgical Oncology use liquid

biopsies to track how breast cancer changes over time through the analysis of circulating tumor cells. They have discovered these cells are indicators of recurrence and the mechanisms at the cellular level can drive resistance to chemotherapy and radiation.

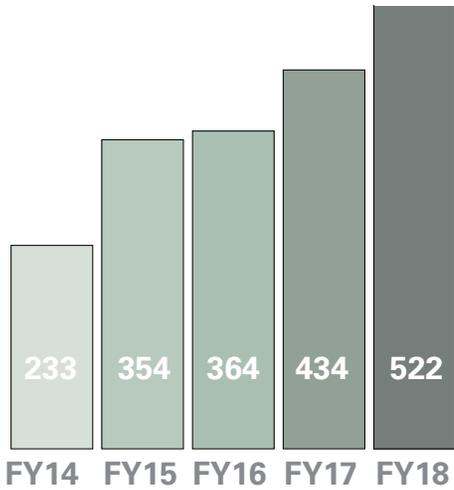
Hunt and her team were involved with changing the staging system used for breast cancer. They analyzed biomarkers within a tumor to create a more detailed profile of a patient’s risk of recurrence. This staging system was part of the rationale for changing the American Joint Committee on Cancer Staging system for breast cancer, which has now become the standard across the nation and in many other countries.

In collaboration with Khandan Keyomarsi, Ph.D., Breast Surgical Oncology professor, Hunt has translated laboratory results from studies of the cell cycle regulator cyclin E, relating to resistance to chemotherapy and endocrine therapy. This biomarker has proven essential to the identification of patients with the greatest risk of recurrence when compared to other prognostic factors, especially in patients with triple-negative breast cancer.

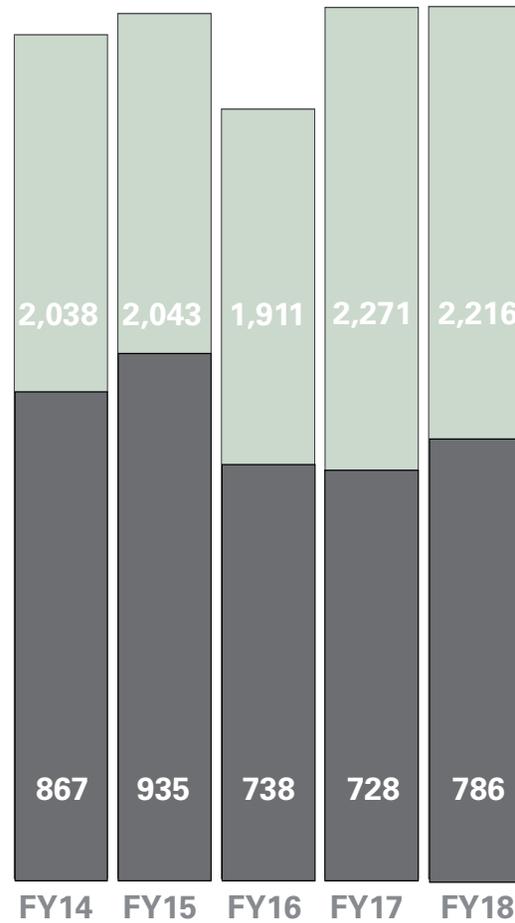
These discoveries in the laboratory are fundamental to developing better treatments and improving the lives of our patients. With a nearly \$6 million award from CPRIT in September 2018 as a part of a multi-institutional team, Breast Surgical Oncology is poised for further contributions to the lives of patients and to breast cancer research.

# Volumes and Outcomes

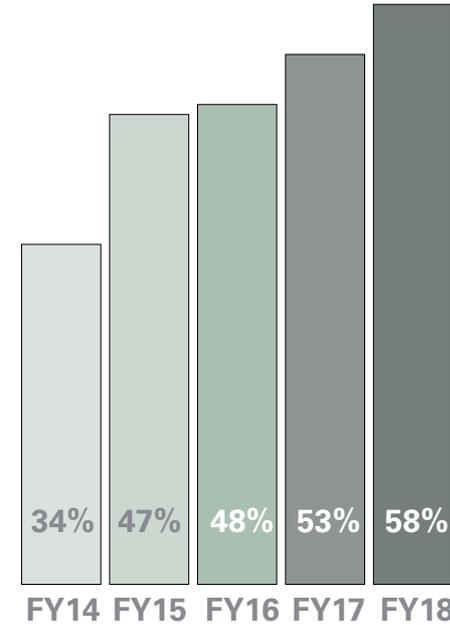
Multi-team clinic visits for newly diagnosed breast cancer patients



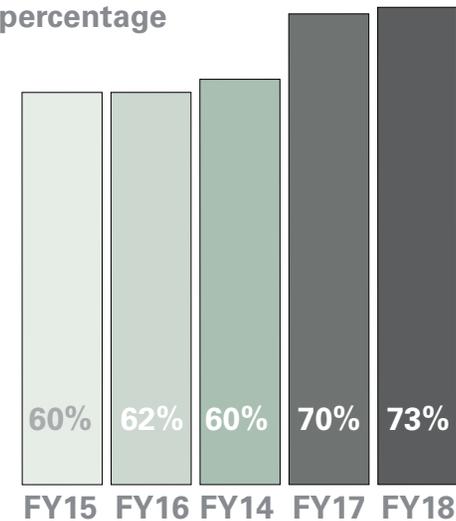
Breast surgery case volumes  
Texas Medical Center location  
and Houston-area locations



Partial mastectomies (lumpectomy and segmental mastectomy) with oncoplastic reconstruction percentage



Total mastectomies (skin-sparing and nipple-sparing) with breast reconstruction percentage



# GYNECOLOGIC ONCOLOGY AND REPRODUCTIVE MEDICINE

Karen Lu, M.D.  
Department chair

Our gynecologic oncologists provide world-class comprehensive care of women with gynecologic cancers. They treat:

- Ovarian cancer
- Uterine cancer
- Cervical cancer
- Vaginal cancer
- Vulva cancer

But they don't simply treat the disease. They introduce and embrace novel therapeutics and advanced surgical techniques to ensure the best outcomes for patients. Some of those treatments include:

- Complex ovarian cancer debulking surgery
- Sentinel node evaluation for uterine, cervix and vulvar cancers
- Fertility-sparing techniques, including radical trachelectomy, a highly specialized procedure that may help some women keep the ability to have children
- Minimally invasive surgeries, including robotic and laparoscopic radical hysterectomy
- Enhanced recovery protocols
- Chemotherapy, biologic and immunotherapy

"Each patient is unique and deserves personalized care, which requires a multidisciplinary approach. We are unique as a surgery department because we also prescribe chemotherapy," says Karen Lu, M.D., chair of Gynecologic Oncology and Reproductive Medicine, the country's largest gynecologic oncology department.

Twenty-nine doctors provide expert care to patients in the Laura Lee Blanton Gynecologic Oncology Center at MD Anderson. In Fiscal Year 2018, they attended 3,810 new patient visits and consults, and performed 1,176 operations.

Doctors also see patients at MD Anderson in League City, West Houston, Memorial City, Sugar Land, and The

Woodlands, and at Texas Woman's Hospital and Lyndon B. Johnson Hospital in Houston. MD Anderson also boasts 11 research faculty dedicated to gynecologic oncology and reproductive medicine.

In addition to treating gynecologic cancers, our team also has a strong commitment to prevention. Our Gynecologic Oncology and Reproductive Medicine faculty staff a specialized colposcopy clinic for pre-invasive cervical, vaginal and vulvar disease, and a high-risk clinic for women at inherited risk for ovarian and endometrial cancer.

We have a unique Oncofertility Clinic to give men and women options to preserve fertility before cancer treatment.

### Practice-changing innovation

MD Anderson has been the birthplace of many surgical techniques and treatments that have become the standard of care for many types of gynecologic cancers. Our physician investigators are constantly re-evaluating and building on those techniques to help our patients live longer, healthier lives with less side effects.

In what became known as the LACC (Laparoscopic Approach to Cervical Cancer) study, Pedro Ramirez, M.D., professor of Gynecologic Oncology and Reproductive Medicine, led a team that studied minimally invasive surgery in treating early-stage cervical cancer. The researchers found that these newer methods were actually less effective and posed a greater risk for patients than the traditional radical hysterectomy. It led to a major shift in the way MD Anderson treats cervical cancer.

In this Phase III clinical trial, Ramirez and colleagues compared minimally invasive radical hysterectomies to open, traditional surgery. The

## Small cell ovarian cancer survivor grateful for life and new beginnings

By Kellie Bramlet Blackburn

At 26, small cell ovarian cancer was the last thing on Tabby Soignier's mind, but she knew the bloating, pain and headaches she'd been experiencing meant something was wrong.

In summer 2011, Tabby made a visit to a local clinic, where a doctor conducted an ultrasound and said that it looked like Tabby's uterus had swelled to the size of a 20-week pregnant woman's. But Tabby knew she wasn't pregnant. She scheduled an appointment with her gynecologist.

Tabby's doctor found a 15 cm tumor on her right ovary. She had surgery to remove it that night.

Two days later, Tabby learned the tumor was malignant and she had a rare type of cancer: small cell ovarian carcinoma. Tabby knew right away she wanted to seek treatment at MD Anderson.

"If you're going to go through something like this, you want the best," she says.

Less than a week later, Tabby had her first appointment with Kathleen Schmeler, M.D., an associate professor of Gynecologic Oncology and Reproductive Medicine who detailed her treatment plan: six rounds of chemotherapy.

It wasn't easy. Tabby endured nausea and lost her hair. She watched so many other people ring the bell — a sign they had completed treatment — and wondered if she would ever do the same.

Then, Tabby got her chance.

"Ringing the bell was an incredible feeling," she says. "I was grinning so hard my cheeks hurt."

She was now cancer free.

Today Tabby visits MD Anderson every six months. She continues her work as a sports reporter in Louisiana, where she lives with her husband, and their greatest gift — a baby boy.

"You couldn't ask for more than just living," she says. "But to bring life into this world is just tremendous."

*A longer version of this story originally appeared on MD Anderson's Cancerwise blog.*



study's results showed that patients who had minimally invasive radical hysterectomies were four times more likely to experience recurrence than those who had open surgery. They also had lower survival rates.

This study's results were shocking. But another study MD Anderson performed in collaboration with Harvard University, Columbia University and Northwestern University found results that supported the LACC trial. This retrospective epidemiologic study, led by J. Alejandro Rauh-Hain, M.D., assistant professor of Gynecologic Oncology and Reproductive Medicine, included analysis of data from two large cancer databases, the National Cancer Database and the National Cancer Institute's Surveillance, Epidemiology and End Results database.

"Our research also found that compared with open surgery, minimally invasive surgery increased the risk of death among women who underwent radical hysterectomy for early-stage cervical cancer," says Rauh-Hain. "Given these two studies, we believe that we can no longer recommend minimally invasive radical hysterectomies for our patients with early-stage cervical cancer."

As a result of the studies' findings, MD Anderson gynecologic oncologists made the decision to no longer perform minimally invasive radical hysterectomies on cervical cancer patients. Our physicians recommend that these patients undergo open abdominal radical hysterectomies instead. The research has impacted national treatment guidelines for the management of the disease.

## Building on discovery

Sentinel lymph node biopsy is a surgical technique used to determine how far cancer has spread. MD Anderson has been one of the leaders in the use of sentinel node evaluation in gynecologic cancer patients. In 2018, Michael Frumovitz, M.D., professor of Gynecologic Oncology and Reproductive Medicine, published a study examining how we could improve that very technique.

In a Phase III noninferiority trial known as Fluorescence Imaging for Lymphatic Mapping (FILM), published in the *Lancet*, Frumovitz and his colleagues found that using an indocyanine green dye that uses near-infrared fluorescence imaging made it easier to track the lymphatic system than the traditionally used isosulfan blue dye. The green dye is approved by the US Food and Drug Administration and commercially available for mapping heart, liver and eye function. And now, the maker of the indocyanine green dye has FDA approval to use the dye in lymphatic mapping based on the study's results.

"This could become the new standard of care for lymphatic mapping and sentinel lymph node biopsy in women with cervical and uterine cancers, and potentially, across subspecialties in surgical oncology," Frumovitz says.

## Grant-funded research

Gynecologic Oncology and Reproductive Medicine physicians are international leaders focused on providing exceptional patient care while linking basic science with clinical and translational research to develop the next-generation of innovative approaches to treatment and prevention of gynecologic cancers.

Investigators in Gynecologic Oncology and Reproductive Medicine have been awarded two Specialized Programs of Research Excellence, or SPORE, grants from the NCI. One grant focuses on ovarian cancer and the other grant focuses on endometrial cancer. These large research grants aim to understand the molecular mechanisms underlying these cancers and then rapidly translate this new knowledge into clinical trials for improved treatment or prevention strategies within five years.

The Endometrial SPORE team has made significant advances in novel therapeutics and improved prevention strategies. These include an innovative treatment that delivers siRNA, a synthetic molecule, using a nanoliposome formulation; studying the poly (ADP-ribose) polymerase (PARP) inhibitor as a targeted therapy; and identification of

the molecular mechanisms that link obesity with increased endometrial cancer risk.

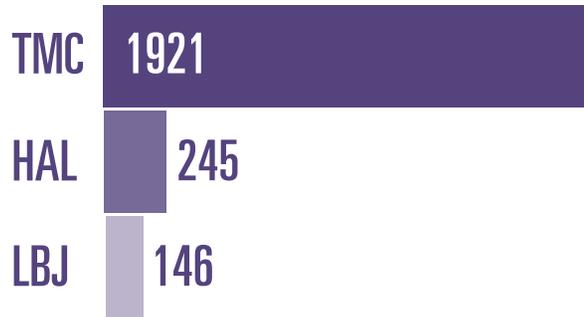
The Ovarian SPORE team has led the field in improving early detection methods and targeted therapeutics for ovarian cancer subtypes. Early detection studies have resulted in expanded diagnostic markers and development of "point of service" screening assays. Exciting clinical studies of anti-angiogenic treatments have shown great promise, as have studies for personalized treatment of low-grade and high-grade ovarian cancers.

As our gynecologic oncologists look to the future, they're focusing on building and strengthening our newly established Center for Rare Gynecologic Malignancies. By concentrating a large volume of patients with rare gynecologic malignancies in one center, we are able to build true expertise, allowing patients to be treated by providers experienced with their specific disease. Our multidisciplinary team of gynecologic oncologists, radiation oncologists, radiologists and pathologists are dedicated solely to gynecologic malignancies.

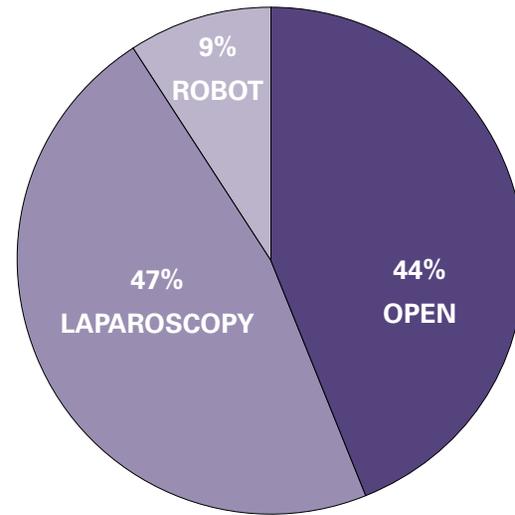
They're also dedicated to bringing their expertise beyond MD Anderson, including to our Houston-area locations and the LBJ Hospital Oncology Service, which in partnership with Harris Health System, serves low-income and medically underserved patients who otherwise might not have access to specialized cancer services such as oncology therapies and surgeries, colposcopy, inpatient care, research participation and education.

# Volumes

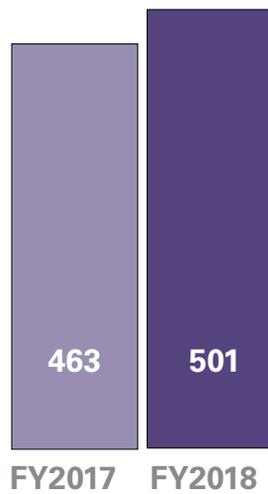
Gynecologic Oncology case volumes FY18



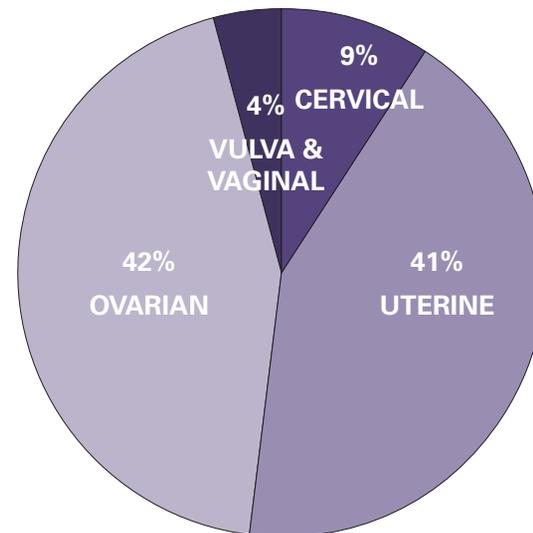
Surgical approach for abdominal surgery FY18



Total Patients - Oncofertility patients



Core surgeries by disease site FY18



# HEAD AND NECK SURGERY

Jeffery N. Myers, M.D., Ph.D.  
Department chair

Randal Weber, M.D.

Treating cancers that occur in the intricate sections of the head and neck region require extraordinary skill to achieve the best possible outcome.

Head and Neck Surgery at MD Anderson serves as a model of excellence in head and neck oncologic medicine and surgery, providing value-based, patient-centric cancer care that promotes discovery in research, education and cancer prevention – while keeping institutional priorities top of mind.

The department treats patients with benign and malignant head and neck tumors. These include, but are not limited to:

- cancers of the oral cavity
- larynx
- pharynx
- nose and sinuses
- salivary glands
- ear and temporal bone
- skull base
- thyroid gland
- skin including melanoma
- sarcomas of the soft tissue and bone.

Using an integrated multi-disciplinary approach, Head and Neck Surgery faculty partner with a diverse team of medical oncologists, radiation oncologists, neuro-radiologists and plastic surgeons to provide state-of-the-art-care for patients with all types and stages of head and neck cancer. By adopting innovative surgical techniques combined with a multi-disciplinary approach, Head and Neck Surgery faculty strive to ensure the best oncologic and functional outcomes are achieved.

“The mission of Head and Neck Surgery is to optimize the oncologic and quality-of-life outcomes for patients afflicted with head and neck cancer through integrated multi-disciplinary oncologic and supportive care and

research,” says Jeffrey N. Myers, M.D., Ph.D., chair of Head and Neck Surgery.

Head and Neck Surgery is a recognized international leader in head and neck cancer care, and has consistently ranked among the nation’s top otolaryngology departments in U.S. News & World Report’s Best Hospitals rankings.

Myers and his team of 36 surgeons provided consultation, prevention, treatment and rehabilitation services to 9,195 new patients in Fiscal Year 2018, and performed over 3,316 operations during that time span.

Head and Neck Surgery’s research lab currently has 5,814 square feet of lab space. There are 31 lab personnel including six research faculty who each have a lab, with five of those faculty being surgeons. There are eight validated cell line studies and 10 ongoing active animal studies.

Head and Neck Surgery comprises five subsections, which provide focused centers of excellence for the treatment of patients and development of research:

- Head and Neck Surgical Oncology
- Head and Neck Endocrine Surgery
- Oral Oncology and Maxillofacial Prosthodontics
- Ophthalmology
- Speech Pathology and Audiology

All of these services treat patients in the Head and Neck Center at MD Anderson’s campus in the Texas Medical Center. Head and Neck surgical oncologists are also available at MD Anderson locations in League City, West Houston, Memorial City and Sugar Land.

Specialized labs and clinics within the Head and Neck Center include the Oral Cancer Prevention Clinic, the Voice Laboratory, and the Swallowing Outcomes Research Laboratory. In these areas, patients work to regain the ability to speak and swallow after treatment for cancer of the voice box and throat.

## Bringing back the voice

By Mena El-Sharkawi

Music was one of the biggest joys of Adel Tawfik’s life. That’s why when he was diagnosed with oral cancer he didn’t want a surgery that threatened to end his ability to sing.

Ehab Hanna, M.D.; Clifton Fuller, M.D., Ph.D.; and now-retired medical oncologist Merrill Kies, M.D.; developed a treatment plan including chemotherapy and radiation therapy. He beat cancer, but one year later, he noticed an odd feeling in his gums that prompted him to visit MD Anderson oncology dentist Alexander Won, D.D.S.

“Two days later, I got the call that my cancer was back,” Adel recalls. This time he had to undergo surgery.

“Dr. Hanna told me before the surgery that there was a chance I might not be able to speak normally for a while,” he recalls. “I told myself, forget about singing.”

During the 10-hour surgery, Hanna extracted Adel’s right cheek bone and sinus, including his upper right teeth and gums, to remove the cancer. Plastic surgeon Peirong Yu, M.D., then reconstructed Adel’s mouth using soft tissue and bone taken from his right leg.

“When I woke up from surgery and could talk, I was so happy. It was proof that the surgery wasn’t as bad as I’d feared,” Adel says.

Adel’s speech continued to improve, and within three months, he was able to hit difficult notes he feared he’d never sing again.

“I couldn’t believe it,” he recalls. When Adel returned to MD Anderson, he wore his “Happiest Cancer Patient in the World” T-shirt and surprised Hanna by singing his favorite song.

“To be able to sing again showed me how skilled Dr. Hanna and Dr. Yu are,” Adel says.

*A longer version of this story originally appeared on MD Anderson’s Cancerwise blog.*

The Ophthalmology section treats orbital, ocular and ocular adnexal malignancies, as well as the ocular complications from cancer therapy. Patient care is provided in the Ophthalmology Clinic at the MD Anderson main campus.

The department's oral oncology and prosthetics (known as maxillofacial prosthodontics) area provides dental and oral rehabilitation to patients before and after treatment. It also designs and places specialized oral implants to ensure the highest quality of life after surgery.

## Putting an end to the epidemic of HPV-related cancers

Over the last two decades, head and neck cancers have increased by 125% in the United States, largely in part to the human papillomavirus (HPV). The rates of HPV-related oropharyngeal cancers are rising at epidemic proportions, accounting for 70% of oropharyngeal cancers. Men comprise a disproportionately large number of that 70%. New cases of oropharyngeal cancers in men now outnumber cases of cervical cancer in women.

In response to the rise in HPV-positive oropharyngeal cancer, Erich Sturgis, M.D., professor of Head and Neck Surgery, has joined MD Anderson's HPV-Related Cancers Moon Shot™ as one of the program's co-leaders. The goal of the HPV-Related Moon Shot is to identify practical solutions and strategies to improve screening and diagnostic options, and develop novel therapeutics to impact the incidence of and deaths caused by HPV-related malignancies.

Currently, there are no screening guidelines for HPV-related oropharyngeal cancer.

The HOUSTON (HPV-related Oropharyngeal and Uncommon Cancers Screening Trial Of men) study aims to create a screening process. The goal of the HOUSTON study is to identify men at high risk for developing HPV-

related cancers through a biomarker assay and screen them for oropharyngeal, anal and penile cancers and pre-cancers. The study is supported by the Moon Shots Program.

"We will use some experimental approaches to see if imaging can identify early oropharyngeal cancers before they are visible to the naked eye," says Erich Sturgis, M.D., co-leader of MD Anderson's HPV-Related Cancer Moon Shot.

Without screening, most HPV-related cancers are diagnosed at a late stage, requiring complicated care that often includes a combination of radiotherapy, chemotherapy and/or radical surgery.

The two goals of the trial are, first, to detect whether serological HPV testing in a high-risk group is an effective screening tool and, second, to identify which tests are most effective for detecting early HPV-related cancers or precancers.

Sturgis says, "The central question is, can we establish a screening mechanism for HPV-related oropharyngeal cancer?"

## Easing side effects through research

The principal goal of the Head and Neck Cancer Program is to alleviate suffering caused by cancers of the head and neck region. To accomplish this goal, we conduct research across the entire spectrum of the natural history of these malignancies to improve prevention, cure rates and quality of life for affected individuals.

Radiation therapy is curative for many head and neck cancers but can result in dysphagia that decreases patients' quality of life and puts them at risk of malnutrition and pneumonia. Although concurrent swallowing therapy during radiation therapy to the neck can help patients avoid or decrease the impact of dysphagia, the optimal approach to swallowing therapy remains unknown.

To determine the appropriate timing and intensity of swallowing therapy, Kate Hutcheson, Ph.D., associate professor of Head and Neck Surgery and associate director of research in the section of Speech Pathology and Audiology, is leading a multicenter randomized trial.

"We have data from small, single-site trials and retrospective studies showing that high-intensity swallowing therapy helps patients maintain their ability to swallow during radiation therapy to the neck," said Hutcheson. "However, a recent Cochrane review was unable to identify best practice in this area, citing the lack of sufficiently powered randomized clinical trials."

A randomized clinical trial that compares reactive swallowing therapy with two proactive approaches of different intensities has been created to gather data for establishing swallowing therapy guidelines. The trial, named PRO-ACTIVE (No. NCT03455608), recently began enrolling patients who plan to undergo radiation therapy with curative intent for head and neck cancer.

The goal of this clinical research study is to compare the effects of RE-ACTIVE therapy with two types of PRO-ACTIVE therapy in patients beginning radiotherapy (RT) for head and neck cancer who are at risk for difficulty swallowing. RE-ACTIVE therapy is started after a patient develops trouble swallowing, while PRO-ACTIVE therapy is started before the problem begins.

The PRO-ACTIVE trial is open to patients who will receive radiation therapy to both sides of the neck to a total dose of at least 60 Gy over 6–7 weeks. Patients with dysphagia at enrollment are excluded. At enrollment, each patient is randomly assigned to the RE-ACTIVE, low-intensity PRO-ACTIVE, or high-intensity PRO-ACTIVE treatment arm.

The effectiveness of each treatment approach will be determined by assessing patients' duration of dependence on feeding tubes, swallowing strength as measured by videofluoroscopy, and scores on symptom and quality-of-life questionnaires.

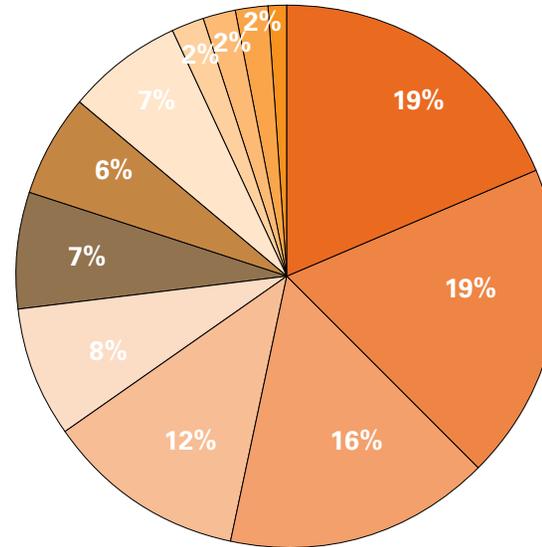
# Volumes

“We hypothesize that the high-intensity PRO-ACTIVE treatment will have the best results, but it could be that we find that one of the lower-burden, lower-resource treatments offers patients a less demanding way to maintain their ability to swallow,” Hutcheson said

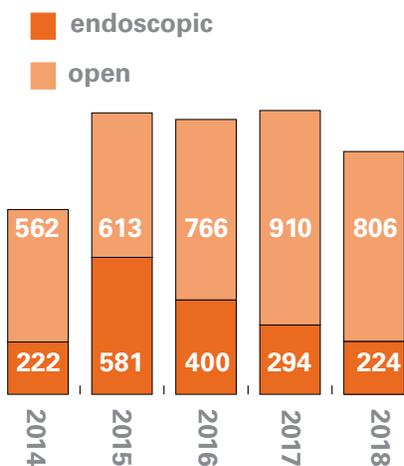
Not satisfied with the success rate of the current swallowing therapy programs, researchers continue to address swallowing issues for which treatments are lacking.

“Swallowing is a huge quality-of-life issue. The key to improving swallowing function is early and individualized therapy,” Hutcheson said. “A dysphagia-specialized speech pathologist can help maximize a patient’s outcome.”

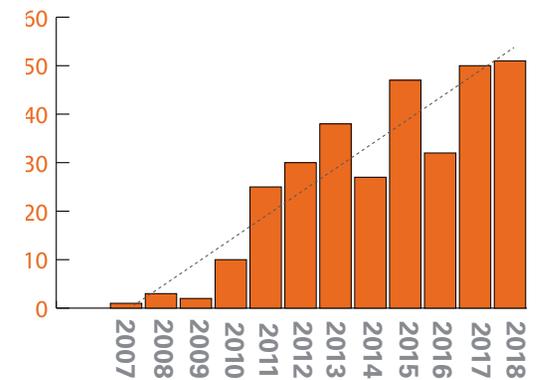
Thyroid/parathyroid	19%
Oropharynx	19%
Skin of head & neck	16%
Lip & oral cavity	12%
Salivary glands	8%
Eye and related structures	7%
Larynx	6%
Sinonasal/skull base	7%
Soft tissues of head and neck	2%
Nasopharynx	2%
Hypopharynx	2%
Ear and related structures	1%



## Skull base procedures (endoscopic & open volume)



## TORS cases





# NEUROSURGERY

Frederick F. Lang, M.D.  
Department chair

 Thomas Campbell

**B**rain, spine and skull base tumors are rare tumors that can severely impact a person's ability to think, see, hear, move and breathe. The Neurosurgery team at MD Anderson is one of the most experienced groups in the nation when it comes to successfully removing these tumors without harming critical functions. In Fiscal Year 2018, MD Anderson neurosurgeons saw 1,833 new patients and consults, and completed 1,100 operations and nearly 600 stereotactic radiosurgery procedures.

MD Anderson provides comprehensive care for all benign and malignant tumors of the central and peripheral nervous system, as well as cancer-related pain. Some of the most common tumors treated at the Anne C. Brooks Brain and Spine Center and MD Anderson's Houston-area locations include:

- Acoustic neuromas
- Chordomas
- Craniopharyngiomas
- Ependymomas
- Gliomas, including:
  - o Astrocytomas
  - o Glioblastomas
  - o Oligodendrogliomas
- Metastatic brain and spine tumors
- Meningiomas
- Medulloblastomas
- Neurofibromas
- Pituitary tumors
- Schwannomas

"Our goal is to remove as much of the tumor as possible, as safely as possible," says Frederick Lang, M.D., chair of Neurosurgery. "We're able to do this and provide the best possible outcomes for our patients because of

the subspecialized expertise and experience of our faculty members."

Neurosurgeons at MD Anderson are particularly renowned for their ability to achieve a high extent of resection, even for tumors in eloquent brain regions that are often considered "inoperable," and to remove many tumors in one piece (en bloc). They use several advanced surgical technologies and techniques to provide the highest quality patient care with low complication rates. These include:

- **Awake craniotomy and functional brain mapping:** the patient is awakened during the operation to verify his or her ability to think, speak, move or reason. MD Anderson neurosurgeons regularly use this procedure to map brain functions before and during tumor removal. By directly stimulating the brain, they are able to identify and preserve areas of the brain necessary for specific functions.
- **BrainSuite® iMRI and intraoperative CT suite:** highly advanced operating rooms that provide real-time imaging during surgery through intraoperative MRI and CT systems. The IOCT Suite was designed by MD Anderson neurosurgeons specifically for imaging and complex surgery for spine patients.
- **Image-guided brain surgery:** state-of-the-art MRI and CT imaging to plan and execute brain and spine surgery. The 3-D volumetric images created by these navigation systems allow surgeons to precisely navigate the patient's brain and spine anatomy during surgery.
- **Gamma Knife radiosurgery and spinal stereotactic radiosurgery:** non-invasive, outpatient, accurate tumor targeting with a single dose of radiation. MD Anderson's second Gamma Knife unit opened in 2019.
- **Endoscopic skull base tumor surgery:** with no incisions or a few small ones in the skull or back of sinuses, the

## A guitar concert during awake craniotomy

By Meagan Raeke

When Robert Alvarez was diagnosed with a low-grade brain tumor in 2013, the active 19-year-old athlete and musician felt the risks of surgery were worse than living with the tumor.

"The doctors told me surgery could leave me paralyzed," he says. Since his symptoms were still minor, Alvarez "just hoped it wouldn't grow and tried to be careful."

That changed in 2017, after he started having seizures and came to MD Anderson, where he met neurosurgeon Sujit Prabhu, M.D.

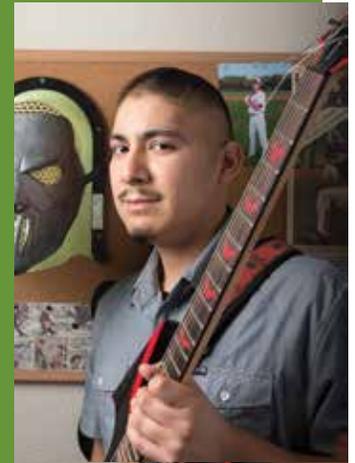
"Dr. Prabhu told me I would be OK. That's what I wanted to hear," Alvarez says. His brain tumor had grown across areas that control speech, motor function, emotions, memory and mood.

Prabhu recommended an awake craniotomy, a procedure where the patient is woken up during surgery to help map and safely preserve critical brain functions as the tumor is removed. He also asked Alvarez to play guitar during surgery to ensure his musical talents wouldn't be harmed – making it the first brain surgery at MD Anderson to include a musical instrument.

"Everything just worked like a symphony," Prabhu says. He successfully removed 90% of the tumor, and Alvarez continued playing guitar through chemotherapy.

VIDEO: [bit.ly/guitarbrainsurgery](https://bit.ly/guitarbrainsurgery)

*A longer version of this story originally appeared on MD Anderson's Cancerwise blog.*



surgeon uses an endoscope to biopsy or remove the skull base tumor. For certain tumors, this approach may reduce complications, damage to healthy tissue, hospital time and recovery time.

In addition to the established neurosurgical oncology program at MD Anderson, recent years have seen several new initiatives develop:

Neurosurgeons at MD Anderson pioneered the use of laser interstitial thermal therapy for brain tumor treatment. This procedure involves inserting a probe directly into the tumor, where thermal heat destroys it. Heat levels are monitored in real time in the BrainSuite. Claudio Tatsui, M.D., associate professor of Neurosurgery, is the first in the world to use this technique for metastatic spinal tumors.

MD Anderson spine tumor patients are also benefiting from a recently opened multidisciplinary spine tumor clinic, which allows patients to see all of their key providers – including rehabilitation, pain medicine, neurosurgery and radiation oncology – on the same day in the Brain and Spine Center. The clinic was opened in 2018 in coordination with the launch of an Enhanced Recovery After Surgery (ERAS) program for spine tumor patients. The goal of this program is to take steps before surgery to ensure shorter hospital stays, decreased pain and a quicker return to normal after surgery.

Navigated transcranial magnetic stimulation (nTMS) is a relatively new technology for pre-surgical planning that identifies functional boundaries of brain tumors. The non-invasive system allows the surgeon to map brain functionality in an outpatient setting prior to surgery. Sujit Prabhu, M.D., professor of Neurosurgery, has shown nTMS is a safe and useful tool to identify and preserve both motor and speech function.

The Neurosurgery team has also played a key role in developing a brain metastasis clinic at MD Anderson, which opened in 2019. In this multidisciplinary clinic, patients with brain metastases receive coordinated care from a

medical oncologist specialized in their primary cancer type, a radiation oncologist specialized in brain metastases, a neuro-oncologist and neurosurgeon, all in a single visit.

## Bringing hope to glioblastoma patients

Glioblastoma is the most common malignant primary brain tumor in adults. This highly aggressive cancer is diagnosed in 15,000 patients each year. Only 5% to 10% are alive five years after diagnosis.

The Neurosurgery department has been at the forefront of collaborative initiatives designed to bring clinicians, translational researchers and basic scientists together to improve the five-year survival of glioblastoma. These initiatives include MD Anderson's Brain Tumor Research Program, Glioblastoma Moon Shot™ Program and Specialized Program of Research Excellence (SPORE) grant for brain cancer research.

"We believe that working together with all disciplines that play a role in brain tumor patient care and research is the only way to make progress for our patients," Lang says.

One of the newest examples of this type of collaborative work is the introduction of the Glioma Longitudinal AnalySiS (GLASS) Consortium as a new project within the Glioblastoma Moon Shot. The consortium is composed of neuropathologists, clinicians, scientists and bioinformaticians from leading institutions across the globe. MD Anderson has taken on a leadership role in the consortium in order to accomplish a major goal of the Glioblastoma Moon Shot: understanding the molecular evolution of gliomas that cause these tumors to become increasingly resistant to therapy. The project will involve gathering paired samples of primary and recurrent tumors during surgery, along with other treatment and outcomes data, for comprehensive analysis.

Neurosurgery faculty members are also leading a number of clinical trials, including two that were developed from bench to bedside at MD Anderson:

Delta-24-RGD, a modified cold virus that destroys gliomas without harming healthy brain tissue, was engineered at MD Anderson by Juan Fueyo, M.D., professor of Neuro-Oncology. Developing and optimizing this viral therapy has been a major project of both the Brain Cancer SPORE and Glioblastoma Moon Shot. Results of the Phase I clinical trial led by Lang were published in *Journal of Clinical Oncology* in 2017 and showed tumor reduction in 72% of patients. Three patients had a complete response, with no recurrence for more than three years.

The study also showed an immune reaction to the tumor following the viral infection, with strong T-cell infiltration. Based on these findings, Lang and his team are participating in a multicenter Phase II clinical trial of Delta-24-RGD and pembrolizumab, a checkpoint inhibitor. While pembrolizumab has not been successful on its own against glioblastoma, investigators anticipate it will produce a better response when combined with the immune reaction triggered by the virus. Patient enrollment for this nationwide trial is expected to continue through 2019.

Currently, the virus is injected directly into the tumor, which isn't a reliably effective delivery method. To combat this challenge, Lang's team has received FDA approval for a Phase I clinical trial to test delivery of the virus via human mesenchymal stem cells derived from the patient's own bone marrow. These cells are capable of targeting the tumor after being injected into the bloodstream. The trial began in 2019.

WP1066 was also created at MD Anderson and entered a Phase I clinical trial in 2018. MD Anderson chemist Waldemar Priebe, Ph.D., and neuro-oncologist Charles Conrad, M.D., modeled this novel STAT3 inhibitor after a natural compound that's able to cross the blood-brain barrier. The laboratory of Amy Heimberger, M.D., professor of Neurosurgery, showed WP1066 prevents tumors from using the STAT3 pathway to evade the immune system and can induce tumor cell death. Heimberger is the PI of WP1066's first-in-human clinical trial, which is

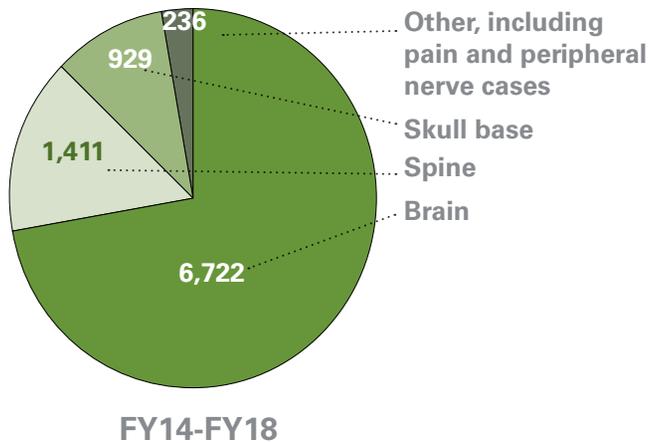
currently open to patients with recurrent malignant gliomas or melanoma brain metastases.

Ganesh Rao, M.D., professor of Neurosurgery, is the site PI for a Phase I clinical trial of Ad-RTS-hIL-12 and vedolimex for recurrent or progressive glioblastoma or grade III malignant glioma. The multicenter study opened to patient enrollment at MD Anderson in 2018.

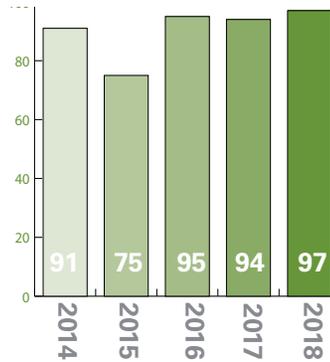
“Our neurosurgeon-led clinical trials demonstrate the department’s commitment to innovative and impactful translational research,” Lang says. “Ultimately, we hope these efforts will help revolutionize patient care for those affected by central nervous system tumors.”

## Case volumes

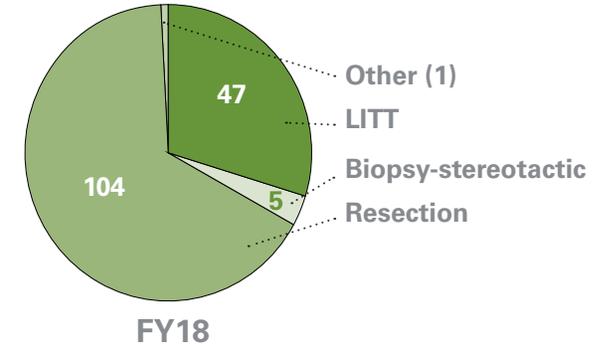
Total neurosurgery cases : 9,298



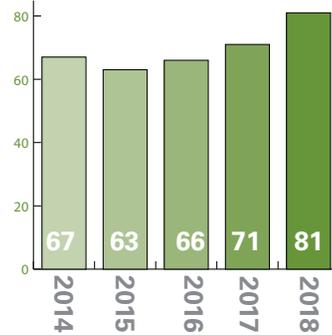
### Awake craniotomy procedures



### BrainSuite procedures



### Primary spine procedures



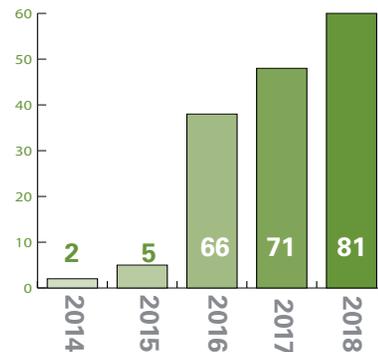
Metastatic spine tumors **531**  
FY14-FY18

Spine LITT procedures **109**  
FY14-FY18

Complex benign and malignant skull base tumors **924**  
FY14-FY18

Pituitary tumors **466**  
FY14-FY18

### Endoscopic skull base tumors



A black and white portrait of Valerae Lewis, M.D., a woman with dark, wavy hair and glasses, smiling. She is wearing a white collared shirt, a dark cardigan, and a beaded necklace. The background is a plain, light-colored wall.

# ORTHOPAEDIC ONCOLOGY

Valerae Lewis, M.D.  
Department chair

## Overview

Most cancers of the bone and soft tissue require extensive surgery by specialized orthopaedic surgeons, who can resect the tumor and then perform reconstruction to give the patient the best possible functional outcome.

Orthopaedic Oncology at MD Anderson provides specialized care to adults and children with benign and malignant tumors of the bone and soft tissue. These include, but are not limited to:

- Soft tissue sarcomas
- Osteosarcoma
- Ewing's sarcoma
- Chondrosarcoma
- Chordoma
- Spine tumors
- Metastatic bone disease
- Giant cell tumors
- Aggressive bone cysts

The department also treats general orthopaedic issues as they relate to MD Anderson patients, including:

- Pathologic fractures
- Avascular necrosis
- Degenerative joint disease
- Muscle and tendon dysfunction
- Compartment syndrome and infections

"Our goal is not just to remove the cancer, but to protect and restore the patient's limb and maximize their function," says Valerae O. Lewis, M.D., chair of Orthopaedic Oncology, whose team of six surgeons uses the most advanced surgical and reconstructive techniques.

Orthopaedic oncology surgeons also use state-of-the-art real-time imaging in the operating room. By using tools

and equipment that can visualize the patient's anatomy in real time, they can precisely remove the tumor and spare as much normal anatomy as possible. To complement real-time imaging, the orthopaedic oncologists often employ surgical navigation. The use of this technology has enabled more complex and detailed surgery to be performed. Navigation can be beneficial in complex spinal, pelvic or periarticular resections. While improving the operative experience it has also had the potential to improve clinical outcomes.

## Treating bone sarcomas in children

Bone sarcomas in children present a unique dilemma for the orthopaedic oncologist. Limb-salvage procedures that rely on endoprostheses or allografts are difficult because of the small size of the pediatric skeleton, the growth potential of the patient, the proposed final length of the unaffected limb, the significant ensuing limb-length discrepancy and the need for durable reconstruction. There are several limb salvage options for the pediatric patient with tumors of the long bones. These include: expandable prostheses, distraction osteogenesis, intercalary allografts and intercalary autografts and rotationplasty. All of the aforementioned procedures except for rotationplasty will require further surgeries as the child grows. Rotationplasties, first performed by Borggreve and then polarized by Van Ness, are an excellent option for children and young adults with bone tumors. Originally proposed for children age 8-10, the procedure is now performed in children and young adults.

A rotationplasty can be thought of as a variation of an amputation. During surgery, in the area of the tumor and the knee, only the major artery, vein and nerve heading to the foot are saved. All other soft tissue and bone are resected, hence an effective amputation. After resection, the lower extremity is rotated counter clockwise and the femur and tibia are secured together. In pre-operative planning, the physician will take into account the age of the child and their growth potential. The surgeon will incorporate this into the surgery, and as the child grows and the unaffected limb

## For the love of the game

By Sarah Zizinia

As a former college volleyball player, Jillian Williams wanted a surgery that would help her beat Ewing's sarcoma and afford her with the best functional outcome.

After completing pre-operative chemotherapy following her diagnosis in 2016, she met with Orthopaedic Oncology chair Valerae O. Lewis, M.D. to discuss surgical treatment options.

Jillian was given the option of an above-the-knee amputation, a rotationplasty or limb-salvage surgery. Being able to stay active was important to Jillian, so she chose to have a rotationplasty. During the operation, Lewis removed the tumor located in Jillian's left tibia along with the knee joint, and then rotated the lower portion of her leg 180 degrees before attaching it to the femur. The rotation of the limb now allowed Jillian's ankle to act as a knee.

This surgery afforded Jillian excellent function, and allowed her to join the US National Sitting Volleyball Team in 2017, which won a silver medal in the 2018 World Championships.

"Something that really sticks with me all the time is don't let the fear of amputation stop you from trying something new. I'm more willing to try new things now that I have one leg instead of two legs," says Jillian.

*A longer version of this story originally appeared on MD Anderson's [Cancerwise](#) blog.*



grows, the knee centers equalize. At skeletal maturity, when the child stops growing, the knee centers will be equal. This offers a great option for patients who wish to return to high impact activities. Patients with rotationplasties are free to pursue all activities that they wish. Patients rejoice in the fact that they have no restrictions on their activities. More and more children and young adults are requesting the procedure.

Tumors of the pelvic bone are some of the most challenging to treat. Hemipelvectomy, which involves surgically removing part of the pelvis, with or without removal of the corresponding leg, is among the department's specialties. The extent of this surgery varies depending on the location and size of the tumor. Lewis established a multidisciplinary pelvic sarcoma team to provide unparalleled care to patients with these challenging tumors. The team is composed of physicians and providers who work with the patients from diagnosis to the operating room through recovery.

While surgeons focus on removing the tumor and saving as much of the normal tissue as possible, the job doesn't end in the operating room. "We have developed an outcomes program to not only help sarcoma patients return to normal activities, but to help them appropriately set expectations and gauge their progress," Lewis says.

After a tumor is removed, several reconstructive options are available. "Our program also helps patients decide on the best reconstructive option for them and their lifestyle," Lewis says. Through prospective studies the pelvic team has rigorously evaluated the various pelvic reconstructive options and their associated functional outcomes. Patients, with the help of visual analytics, can now choose the functional outcome that best suits their expectations and lifestyle. The patients are also able to see their progress in recovery compared to others with similar disease and treatment. This dedicated multidisciplinary

team has improved both the functional and oncologic outcomes of patients with pelvic sarcomas.

## **Illuminating molecular pathways through research**

The Orthopaedic Oncology department includes a robust research program that spans basic science to clinical and translational research. Its basic science research program focuses on mouse models, targeted therapy and molecular mechanisms for the spread of bone cancer.

Lewis' research interest is in the treatment of osteosarcomas. Lewis' laboratory is focused on illuminating the molecular pathways that osteosarcoma cells use to grow and spread. By investigating the molecular pathways, Lewis is working to develop site-specific therapy for osteosarcoma that is directed to the tumor while sparing normal organs. Discovery of functional ligand-receptor systems is the critical first step. The search for answers has led her to study histone methyltransferases. These molecules modify the structural proteins that bind to DNA and give chromosomes their coiled shape inside the cell. But when they malfunction, histone methyltransferases can turn off the activity of protective genes that suppress tumor formation.

She recently focused on a specific type of histone methyltransferase called EZH2. Earlier research has implicated EZH2 in several types of cancer, and Lewis showed that the molecule also plays a critical role in the development of metastatic disease. With philanthropic support, her laboratory is ready to take the next step and begin research to evaluate whether inhibiting EZH2 activity in osteosarcoma cells can prevent the development of metastatic disease.

Robert Satcher, M.D., Ph.D., associate professor of Orthopaedic Oncology, is studying how cancer progresses by spreading to the skeleton, with an emphasis on

understanding destructive (osteolytic) bone metastasis formation. Bone metastasis in most cancers can cause pathologic fractures, and herald a poorer patient prognosis. Current treatment options are limited, and palliative surgery or radiation is often needed. Satcher hopes to identify the important steps in bone disease development, and in doing so, develop new treatment strategies for preventing or reversing this lethal process.

Specifically, Satcher has developed a 3D co-culture model that mimics the bone environment. The model captures key cell-cell and cell-matrix interactions that promote tumor cell invasion and growth for the purpose of bone destruction. This model has proven to be a key approach for deciphering cellular responses.

Satcher's team has identified a molecule, BIGH3, secreted by invading cells, that appears to be central to producing the coordinated activity leading to bone destruction. They are now working to establish proof of principle in showing that osteolytic bone lesions can be treated by blocking interactions coordinated by BIGH3. This work will be used for clinical trials testing new drug combinations for reducing tumor progression in bone.

Satcher is also the principle investigator for the bone metastasis tissue bank. The purpose of this repository is to store samples of bone metastasis tissue from patients undergoing orthopaedic procedures. This tissue is an invaluable tool, providing patient samples for the entire institution and research community that is focused on studying bone metastasis. With these samples, a precision approach for targeting bone metastasis treatments is envisioned for individual patients.

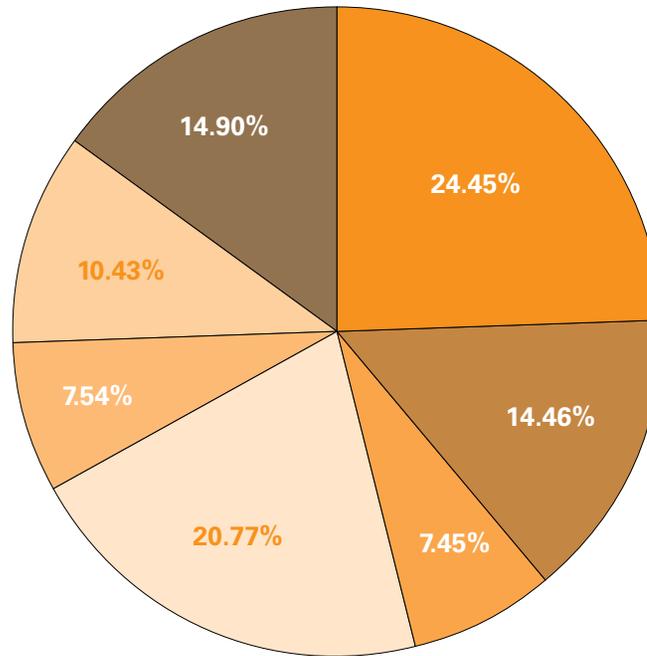
Finally, Satcher is conducting a study to evaluate the use of telemonitoring for patient follow up and recovery after palliative orthopaedic surgery.

"I initially was involved with using telemedicine as an astronaut, where I served as the medical officer for our crew

# Volumes

on orbit. Our current work at MD Anderson is helping us to understand how to use virtual care, videomonitoring, and telemonitoring techniques, to most efficiently care for cancer patients,” Satcher says.

“It can be difficult for patients to return to the medical center following surgical procedures because of both distance and expense. If we can manage these patients just as well using technology (i.e. live video, remote electronic monitoring), it provides benefits to the patient (reduced costs, convenience), and is helpful in making our clinics more efficient. We are in the final phase of the study, and so far have found that both patients and doctors report that using mobile surveillance is acceptable, and enables postoperative care that is subjectively comparable to a face-to-face visit. This pilot study will be used to design additional studies using mobile surveillance for comprehensive patient care.”



## Orthopaedic Oncology Major Cases in FY16/FY17/FY18

Hemipelvectomy **85**  
FY16-18

Soft tissue sarcoma **170**  
FY16-18

## Orthopaedic oncology major cases percentage in FY16/17/18

Hemiarthroplasty	14.46%
Hemipelvectomy	7.45%
Femur resection	20.77%
Humerus resection	7.54%
Sacrectomy/spine	10.43%
Soft tissue sarcoma	14.90%
Total arthroplasty	24.45%

A black and white portrait of a middle-aged man with short, light-colored hair and glasses. He is wearing a dark suit jacket, a white dress shirt, and a patterned tie. He is smiling slightly and looking directly at the camera. The background is out of focus, showing what appears to be an outdoor setting with trees.

# PLASTIC SURGERY

Charles Butler, M.D.  
Department chair

When there are missing structures and tissue following treatment, our plastic surgeons step in to restore form and function and improve aesthetics for patients. The department's surgeons have pioneered techniques that are the gold standard for care and perform complex surgeries not done elsewhere.

"We have the chance to improve a patient's quality of life, and our colleagues rely on us to do so," says Charles Butler, M.D., chair of Plastic Surgery.

"Knowing we can reconstruct essentially any defect allows them to be more aggressive with tumor resections to save a patient's life."

Butler and his team of 23 plastic surgeons perform a host of procedures. These include:

- Tissue flaps
- Skin grafts
- Free-tissue transfer
- Reconstruction of all body areas (breast, torso, extremities, pelvis, head and neck, and trunk)
- Soft tissue transplantation

In addition to common reconstructions, the team executes innovative procedures such as:

- Robotic and minimally invasive plastic surgery
- Lymphedema surgery
- Complex abdominal wall reconstruction
- Complex head and neck reconstruction
- Reconstructions are not limited to cancer type.

Plastic surgeons manage the results of care from all diseases and also treat wounds, infections, tissue loss and injuries from cancer therapies. In FY18 the Plastic Surgery team saw 3,447 new patients and performed 2,115 primary plastic surgery operations. Plastic surgeons see patients at MD Anderson in the Texas Medical Center, West Houston and Sugar Land.

## Staying in the race

by Kellie Bramlet Blackburn

Mary Lindimore has completed sprint triathlons, half marathons and most recently the IRONMAN Waco 70.3 triathlon. She has also overcome three different types of breast cancer and debilitating lymphedema, a common cancer treatment side effect that causes blockages in the lymphatic system and leads to swelling and pain.

"I couldn't have done it without the lymph node tissue transfer surgery," Mary says. "It's a real gift, and MD Anderson gave that to me."

Mary developed lymphedema in 2007, during her first round of treatment for HER-2+ breast cancer. Her arm was so swollen she had to buy specially made clothing. Nothing made it better, not even treatments like wraps and massages.

Then, in 2016, when Mary was diagnosed with breast cancer for the second time, she decided to seek a second opinion at MD Anderson.

There, not only did she receive breast cancer treatment, but she also saw Mark Schaverien, M.D., a plastic surgeon who specializes in treating lymphedema. He explained that Mary's lymphatic system was like a clogged pipe. He could treat it in two different ways. One was a surgery called a lymphatic liposuction that reduces swelling. The other was a surgery called a lymph node transfer. In the latter, surgeons take lymph nodes from other parts of the body and use them to fix the spot where the lymphatic system is clogged, like a plumber replacing pipes. This allows the patient's lymphatic system to drain fluid. While the procedure can't completely reverse lymphedema, nearly 100% of patients saw a positive change, Schaverien explained.

"I was stunned," she says. "In nine years, Dr. Schaverien was the only person who had given me hope."

In December 2016, Mary had a partial mastectomy to remove the cancer, a sentinel node biopsy to determine if the cancer had spread and a lymphatic liposuction.

Almost immediately after surgery, Mary noticed the swelling in her arm was gone. The biopsy showed some cancer still remained, so in May, Mary had a double mastectomy, reconstruction and the lymph node transfer. While the liposuction had already reduced the swelling, the lymph node transfer would help her lymphatic system drain normally, making the change more permanent.

MD Anderson's Breast and Plastic Surgery teams worked together seamlessly to perform all the procedures in one 10-hour surgery.

"The collaboration between the teams was just amazing," Mary says.

Now, with more races under her belt, Mary shows no signs of stopping. She continues to run, swim and bike.

"The surgery changed my world," Mary says. "The quality of life I have now is just amazing."

*A longer version of this story originally appeared on MD Anderson's Cancerwise blog.*



## Revolutionizing breast reconstruction

MD Anderson performs more breast reconstruction than any other reconstructive surgery. Almost all of our plastic surgeons perform breast reconstruction surgery, and they're always looking at ways to improve the experience for our patients.

Recently our plastic surgeons introduced a new way to perform breast reconstruction using biologic mesh. The original standard of care called for plastic surgeons to place the implant under the muscle, but thanks to a new technique called pre-pectoral breast reconstruction, doctors now place the implant over the muscle. This improves the aesthetic and reduces pain.

MD Anderson was also the site of the novel use of a minimally invasive, robotic surgery that helps patients heal faster and more comfortably. To anchor a mastectomy patient's implants, protect them from infection, and create a better cosmetic outcome, doctors cover the implants in one of two ways: with a biologic mesh, or with the latissimus dorsi muscle that is located in the mid and upper back.

Jesse Selber, M.D., professor of Plastic Surgery, pioneered a surgery that helps patients heal faster after latissimus dorsi harvest by making three small incisions under the patient's arm – each less than a half-inch in length - using the Da Vinci robot.

This procedure is routinely performed only at MD Anderson. The success rate, Selber says, is 100 percent.

"There's been no loss of muscle viability," he says, "and we've not had to convert to the more invasive technique."

## Restoring quality of life

Our plastic surgeons are dedicated to helping our patients return to the quality of life they experienced prior to their cancer diagnosis. One way they do this is by surgically treating lymphedema, a common cancer side effect that

leads to severe swelling and occurs when the lymphatic system is unable to drain after the lymph nodes have been removed or damaged.

Traditionally, lymphedema is treated with special massages and compression wraps. These treatments only help ease symptoms temporarily. But two different surgeries can be performed to actually reroute the lymphatic system and help fluid drain through the impacted areas, such as the arms.

In one surgery called the lymphatic bypass, surgeons re-route the lymphatic system by disconnecting lymph vessels and reconnecting them to blood vessels to restore lymphatic drainage function.

In another surgery called the a lymph node transplant, surgeons remove healthy lymph nodes from another part of the body – groin, abdomen, intestine, etc. – and move them to the area closer to the swelling so that the lymphatic system can drain properly.

"Lymphedema has a huge impact on a patient's lifestyle. It can be painful and can even make it difficult to find clothing that fits," explains Ed Chang, M.D., associate professor of Plastic Surgery. "We've been performing these surgeries since 2008 and nearly 100% of our patients have experienced an improvement."

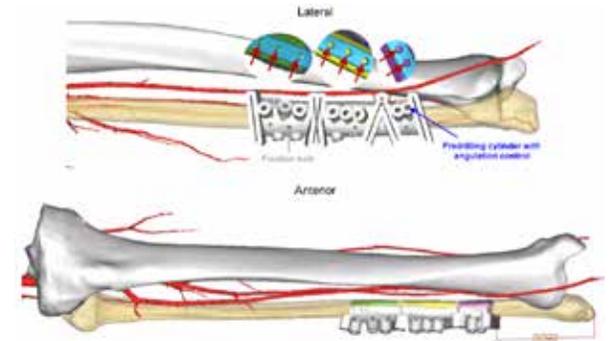
MD Anderson is the only institution that routinely performs both surgeries. Our plastic surgeons are researching how we can use these techniques not only to treat lymphedema, but to prevent it.

"We currently have a trial for selected patients at high risk of developing lymphedema which involves prophylactic lymphovenous bypass surgery. We do the surgery at the time patients have the lymph nodes removed as part of their breast cancer treatment," says Mark Schaverien, M.D., assistant professor of Plastic Surgery. "This is an ongoing study. Preliminary evidence suggests this is an effective strategy, and we hope to report more findings soon."

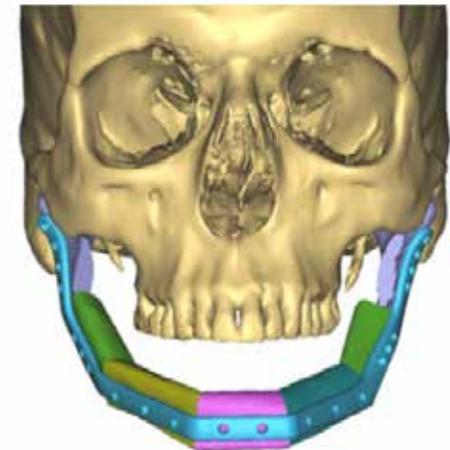
## Using technology to improve outcomes

Our plastic surgeons use two methods to help increase accuracy in reconstruction:

- Virtual surgical planning: using computers to generate virtual models for more accurate reconstruction surgeries (see images)
- Rapid prototype modeling: using 3-D printers to create models



3D printed cutting and drill guides are based on computerized models of the patient's leg bones and arteries created from CT scans. These cutting and drill guides enable our surgeons to create precisely-designed, vascularized, bony reconstructions for a patient's jaw, midface or spine.



Our plastic surgeons are using virtual surgical planning to visualize and outline the steps for complex reconstructions before the patient enters the operating room. In this picture, a vascularized fibula bone from the patient's leg will be used to replace most of this patient's jaw.

At MD Anderson, we use 3-D printed models to create exact replicas of body parts damaged by cancer. These replicas, or models, serve as templates to guide doctors as they carve and shape customized, implantable body parts out of patients' own bone or tissue. The results are more natural and more realistic. It even allows us to reconstruct areas we never could before this type of technology existed.

"Our own Plastic Surgery department has the highest volume of users of this strategy and technology in the world," says Patrick Garvey, M.D., associate professor of plastic surgery. "As a result, our surgeons are the most experienced when it comes to using this technique."

### Bringing new insights to abdominal wall surgery and fat grafting

The second highest volume of surgeries our plastic surgeons perform are hernia and abdominal wall repair. Patients with all types of cancer who have surgery can be at risk for developing a hernia. Not only are our surgeons highly skilled because of the high volume of surgeries they perform, but they're constantly looking at ways to improve the surgery.

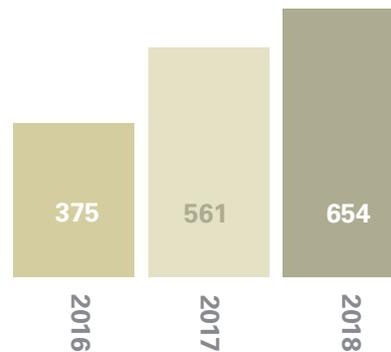
MD Anderson is home to a lab where researchers are studying how stem cells taken from fat can be used to help abdominal walls heal in rats. A recent study showed that the stem cells could help reduce severe inflammation and activate muscle restoration. In short, those rats injected with stem cells saw improved wound healing.

Our researchers are also investigating whether different types of fat and different ways of grafting fat can improve patients appearance, while lowering risk of cancer recurrence. In one particular study, a review was performed of 119 consecutive patients undergoing autologous fat grafting for oncologic head and neck reconstruction from 2005 to 2014. Aesthetic outcomes were rated by a group of 10 plastic surgeons and 10 laypersons using a five-point Likert scale.

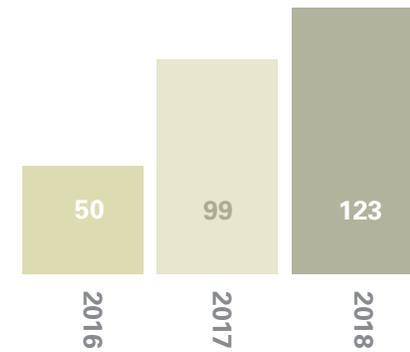
This study found that autologous fat grafting plays a valuable role in enhancing aesthetic outcomes, either by complementing or replacing reconstructive flaps for oncologic head and neck reconstruction. The technique was found to have low complication rates and no evidence of being associated with cancer recurrence.

## Volumes

Free Flap Cases 2016-2018



Lymphedema Surgeries 2016-2018



# SURGICAL ONCOLOGY

Jeffrey E. Lee, M.D.  
Department Chair

 Adolfo Chavez

In Surgical Oncology at MD Anderson, we treat patients with a wide variety of malignant and benign tumors. The department is comprised of a number of specialty disciplines:

- Acute Care Surgical Oncology & General Surgery
- Colorectal Surgery
- Endocrine Surgery
- Gastric-HIPEC
- Hepato-Pancreato-Biliary (HPB) Surgery
- Melanoma Surgery
- Pediatric Surgery
- Sarcoma Surgery

Providers in these sections assess, plan treatment, and provide surgical services to cancer patients, with goals that include improving survival, shortening recovery, and minimizing treatment-related side effects.

Providers in each specialty discipline continuously strive to better identify those patients most likely to benefit from surgery, and to advance and implement new cancer surgical techniques. In particular, Surgical Oncology faculty are broadening the use of minimally invasive laparoscopic and robotic techniques to lessen the impact of necessary surgery on patients with cancer.

“Our constant drive for improvement, innovation and excellence is one of the major reasons our surgeons are among the best in the country,” says Jeffrey E. Lee, M.D., chair of Surgical Oncology. “Plus, our surgeons care deeply about patient surgical safety and quality of life.”

Lee and his team of 38 doctors attended 6,923 new patients and consults, and performed 5,169 operations in Fiscal Year 2018. They see patients in the Child and Adolescent, Melanoma, Sarcoma, Gastrointestinal, Colorectal, Endocrine, and the Infusion Therapy Centers at MD Anderson. They also see patients at MD Anderson in League City, Sugar Land, The Woodlands, and West

## Sarcoma survivor finds a way

by Kellie Bramlet Blackburn

As a high school soccer player, Alex Frankenfeld often heard his coach say, “Busca la forma,” Spanish for “Find a way.” Three years later, Alex was diagnosed with soft tissue sarcoma, and the phrase became a mantra that helped him get through the experience. “I’m going to do whatever I can to beat this thing,” Alex told his mother on their first trip to MD Anderson in fall 2015. “Mom, I’m going to find a way.”

Alex had just started his junior year at the University of Oklahoma when he began noticing sarcoma symptoms: frequent urination, constipation and back pain so intense he found himself in the emergency room. A CT scan revealed an 11-inch mass in his pelvis. He was diagnosed with stage II leiomyosarcoma, a very rare type of soft tissue sarcoma. At the time, Alex was only 21.

After Alex received his diagnosis from a doctor in Dallas, he made two important decisions: he was coming to MD Anderson for soft tissue sarcoma treatment – his parents heard it was the best – and he was putting college on hold.

“In some ways, it was a hard decision,” he says. “But in other ways, it was easy. My life was so much important than anything else.”

Alex had his first appointment at December 2015, when he met with Christina Roland, M.D., a surgeon and associate medical director of the Sarcoma Center, and Ravin Ratan, M.D., an oncologist. They outlined his sarcoma treatment plan: 18 weeks of chemotherapy and 25 rounds of radiation, followed by surgery to remove the tumor. Alex received chemotherapy and radiation in Dallas so he could continue to live at home.

After finishing chemo and radiation, Alex began to prepare for the next step: surgery. That procedure took place on June 20, 2016. During the surgery, Roland removed the tumor and a part of a nearby vein. Then, Tam Huynh, M.D., a cardiovascular surgeon, helped replace it with one grafted from Alex’s leg.

William Graber, M.D., a urology surgeon, assisted. Given the location of the tumor, Dr. Graber was concerned that they might have to remove Alex’s bladder. Fortunately, surgeons were able to keep it intact, and help Alex officially become cancer-free. It was a huge sigh of relief. He had beat this thing. He had found a way.

Alex stayed in the hospital 10 days following the surgery. While he was recovering, he grew close to his care team.

“My faith, family and friends were what helped me get through,” he says. “Dr. Roland, her physician assistant and clinical nurse Erica Gardenhire, Dr. Graber, Dr. Ratan — they were all there for me when times were really tough. So, I look at MD Anderson as a part of my family.”

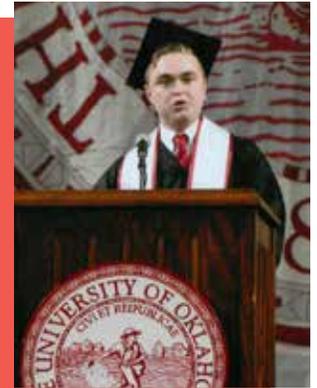
After a few weeks, Alex was able to get moving again with the help of a walker. He returned to Dallas, where he spent hours walking around the mall with his father to regain his strength. Today, Alex’s only remaining signs of cancer are a scar and some nerve symptoms in his leg.

“But I’m alive, so you’ll never hear me complain about that,” Alex says.

Alex returned to school in the fall of 2016. The following year, he completed his degree in finance. And not only did he walk across the stage at graduation, but he was selected as a commencement speaker for the ceremony.

Today, Alex looks back on his college years, including his cancer experience, and knows he learned more than any book or class could ever teach him. He’s learned that no matter what challenges arise, he’ll always find a way.

*A longer version of this story originally appeared on MD Anderson’s Cancerwise blog.*



Houston. In addition, the Surgical Oncology team includes five full-time research faculty.

MD Anderson surgical oncologists collaborate across disciplines and surgical specialties, partnering with colleagues in Medical Oncology, Radiation Oncology, Pathology, and Diagnostic Imaging to integrate preoperative targeted therapies and immunotherapies. They collaborate with other surgery departments for multi-visceral resection, soft tissue resection, and implementation of novel surgical therapeutics, such as limb perfusion.

Several recent initiatives from three of our specialty disciplines are highlighted: **Colorectal Surgery Section:** This section **sees one of the highest volumes of surgical patients and are leaders in minimally invasive surgery.** Our surgeons are known for sphincter preserving surgeries that can help patients avoid the need for a colostomy, which can have a life-changing impact.

“We have unique expertise in sphincter preserving surgeries as well as complex surgery for primary and recurrent rectal cancer,” says George Chang, M.D., professor of Surgical Oncology. “Many patients seek our care after being told elsewhere that their treatment would require a permanent colostomy.”

Importantly, a recent study showed that patients with stage 2 colorectal cancer who had their surgeries performed by MD Anderson Colorectal Surgery Section faculty experienced lower recurrence rates than those treated at other hospitals across the nation.

For patients with identified or suspected inherited colorectal cancer syndromes, the High Risk Cancer Clinic provides comprehensive genetic evaluation and advanced individualized treatment planning.

**HPB Surgery Section:** This section treats cancers of the liver and pancreas. Our HPB surgeons perform complex operations in patients for tumors that surgeons at other cancer centers have deemed to be “unresectable.” Despite

this, the section has **one of the lowest mortality rates following liver and pancreas operations.**

In pancreatic surgery, the team has reported the highest rate of cure and longest rate of survival following surgery in the international literature, says Matthew Katz, M.D., associate professor of Surgical Oncology.

In addition, MD Anderson pancreatic cancer surgeons have led multiple clinical trials, with the coordinated goals of maximizing patient survival as well as quality of life. These trials have helped surgeons understand how to improve delivery of existing pre- and post-operative drug and radiation therapy regimes and have tested the efficacy of new therapeutics. Surgeons have also studied ways to optimize each patient’s condition prior to surgery, and have evaluated clinical, molecular, and genetic information in an attempt to create individualized patient-centric treatment algorithms that employ surgery at the time most likely to lead to a favorable therapeutic outcome.

“If you can identify the genetic makeup that forms the cancer, you can better determine how aggressive that tumor is and the best way to treat it,” says Jean-Nicholas Vauthey, M.D., professor of Surgical Oncology.

## Melanoma research and prevention

Surgical Oncology researchers are evaluating and perfecting surgical care across 16,000 square feet of lab space and with over 200 active studies. Through these investigations, they expect to improve survival, shorten recovery times, and minimize treatment-related side effects for cancer patients.

Jeffrey E. Gershenwald, M.D., professor of Surgical Oncology, is leading multidisciplinary efforts to advance personalized medicine and targeted therapies for patients with melanoma. In 2017, he served as chair of the AJCC Melanoma Expert Panel’s efforts to change melanoma staging after studying a database of more than 40,000 patients worldwide. This revised staging system will guide

melanoma patient treatment, provide better prognostic estimates, and refine stratification of patients entering clinical trials. The revision was a part of the recently released “American Joint Committee Cancer Eighth Edition Cancer Staging Manual,” for which Gershenwald served as expert panel leader.

Gershenwald’s work is closely linked to that of Surgical Oncology associate professor Jennifer Wargo, M.D., who is leading award-winning research on the microenvironment surrounding certain tumors, specifically how the intestinal microbiome, or bacteria in the gut, helps determine tumor growth and responses to certain cancer treatments, including immunotherapies.

Wargo and her lab team are dedicated to conducting basic research on melanoma and the microbiome and coordinating those efforts with other organizations. Recently they looked at immunotherapy checkpoint blockade in melanoma patients by examining fecal microbiome samples. Immune profiling suggested enhanced systemic and antitumor immunity in responding patients with a favorable gut microbiome, as well as in germ-free mice receiving fecal transplants from responding patients. Together, these data have important implications for the treatment of melanoma patients with immune checkpoint inhibitors.

“While our findings in this study and others are compelling, we also appreciate that there is a lot of work still left to be done. Our results and those of others indicate that the microbiome could potentially be modulated to enhance the efficacy of immune checkpoint blockade therapies, though this must be carefully tested in the context of clinical trials,” Wargo says.

Last, Wargo’s lab is working to improve patient survival in a randomized Phase II clinical trial using novel molecularly targeted therapy delivered before and after surgery. The trial finished early due to the dramatic nature of the results, which demonstrated that neoadjuvant plus adjuvant dabrafenib and trametinib significantly improved

event-free survival versus standard of care in the enrolled patients. The results immediately resulted in a change in the standard of care in favor of neoadjuvant (preoperative) therapy for such patients.

Both Wargo and Gershenwald, along with Michael Davies, M.D., Ph.D., chair of Melanoma Medical Oncology, are actively involved in MD Anderson's Melanoma Moon Shot, an effort to dramatically reduce melanoma deaths.

The Moon Shot is not only focused on identifying new and improved ways of treating melanoma, but also on preventing melanoma from ever starting. Gershenwald partnered with several colleagues in Poland in a multidisciplinary effort contributing to national legislation that restricts indoor tanning use for minors under 18.

"We worked with melanoma colleagues in Poland and requested data from their cancer registry. Remarkably, we learned that between 2005 and 2015, melanoma rates nearly doubled in women under age 45," says Gershenwald, medical director of the Ben Love/El Paso Corporation Melanoma and Skin Center at MD Anderson. "From there, we shared significant scientific evidence about the dangers of indoor tanning and the potential impact of public policies aimed at reducing skin cancer risk in youth with the Polish health ministry and other governmental officials and presidential staff."

The MD Anderson team was recognized for this collaboration by the Chancellery of the President of the Republic of Poland, and in November 2017, a bill prohibiting the use of tanning beds by minors was signed into law and was enacted nationwide in Poland in early 2018.

The Polish law is based on similar legislation that was passed in Texas in 2013. MD Anderson surgical and medical oncologists and behavioral scientists from the Melanoma Moon Shot, MD Anderson Governmental Relations and the cancer prevention and control platform were instrumental in that accomplishment. They joined advocacy organizations from across the state to educate legislators about the dangers of tanning beds. They're also partnering

with the *American Cancer Society Cancer Action Network*, a nonprofit advocacy affiliate of the *American Cancer Society* which promotes evidence-based policies at all levels of government to improve access to care and quality of life for cancer patients, additional cancer prevention and early detection programs, and increased tobacco regulation.

## Volumes

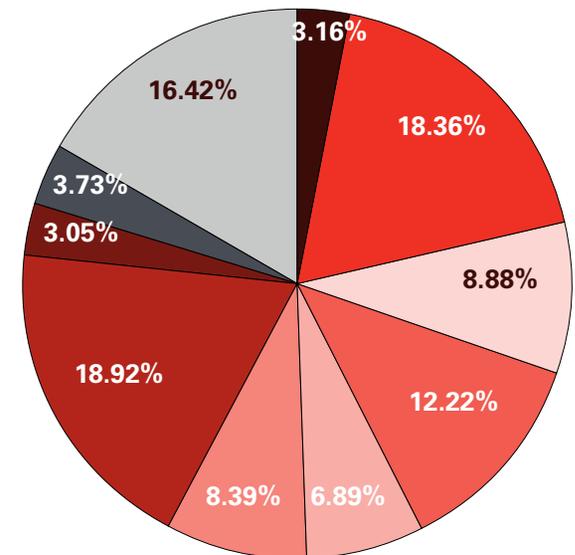
Hepatectomies

**529**  
FY18

Colectomies

**585**  
FY18

## Surgical Oncology cases by section FY18



Colorectal	18.36%	Melanoma	18.92%
Endocrine	8.88%	Pancreas	3.05%
Gastric/Hipec	12.22%	Pedi	3.73%
General	6.89%	Port	16.42%
Liver	8.39%	Sarcoma	3.16%

A black and white portrait of a man with glasses, wearing a suit and tie, looking directly at the camera. The background is a blurred stone wall.

# THORACIC AND CARDIOVASCULAR SURGERY

Ara Vaporciyan, M.D.  
Department chair

Adolfo Chavez

Cancers in the lung and esophagus account for more deaths than the next three most common cancers (breast, prostate and colon) combined. Surgery often provides the greatest opportunity for cure.

Providing curative opportunities to a wider range of patients and delivering them with fewer side effects is the focus of Thoracic and Cardiovascular Surgery at MD Anderson.

The department treats all cancers within the chest. These include:

- Lung cancer
- Esophageal cancer
- Mesothelioma
- Mediastinal tumors
- Cancers of the chest wall
- Cancers of major blood vessels
- Cancers that originate in or invade the heart
- Cancers that spread to the lungs

The department treats these cancers using novel surgical techniques to ensure the best results for patients. These include:

- Minimally invasive surgery (thoroscopic and robotic surgery)
- Organ-sparing resections (lung segmental and sleeve operations; esophageal endoscopic mucosal resection)
- Endobronchial and esophageal ultrasound for cancer staging
- Pancoast tumor resection with or without vertebrectomy
- Complex chest wall resection and reconstruction
- Jejunocolic interposition for esophageal reconstruction

- Heated intraoperative chemoperfusion for pleural cancers

In addition, the team performs conventional open procedures, including:

- Wedge resection
- Lobectomy
- Pneumonectomy
- Esophagectomy

Surgery is often combined with chemotherapy, radiation therapy, immunotherapy or targeted therapies to further improve outcomes.

Thoracic and Cardiovascular Surgery includes a team of 10 surgeons and four researchers. They provide complete care to patients in the Thoracic Center at MD Anderson and at MD Anderson in West Houston, Sugar Land and The Woodlands. The team saw 948 new patients and consults, and performed 1,790 operations in Fiscal Year 2015.

“We offer unique diagnostics, treatments and survivorship programs so patients can come to our center for every aspect of their cancer care,” says Ara Vaporciyan, M.D., chair of Thoracic and Cardiovascular Surgery. “Plus, we work across disciplines to ensure our patients receive the best care.”

The department hosts an active lung cancer screening program for current and former smokers to help detect lung cancer at its earliest stage, when treatment is most effective.

Thoracic and Cardiovascular Surgery includes a Vascular Surgery Program. It provides diagnostic evaluation, medical, endovascular and operative care to cancer

## Finding less evasive surgical options

By Kellie Bramlet Blackburn

Never-smoker Lauren Rodriguez was shocked when she was diagnosed with lung cancer at age 18. She saw a surgeon near her hometown in Dallas who outlined a complicated surgery requiring multiple incisions and chest tubes to help her breathe after surgery. It made her nervous.

Spotting her daughter’s anxiety, Lauren’s mom suggested they seek a second opinion at MD Anderson. On July 26, 2017, Lauren and her mom drove nearly four hours to see Mara Antonoff, M.D., associate professor of Thoracic and Cardiovascular Surgery, at MD Anderson in Sugar Land.

“From the moment I met her, I knew this was the surgeon I needed,” Lauren says.

Antonoff outlined the surgery she planned to perform. She would use a surgical technique that only required one incision and one chest tube, which would be removed before Lauren left the hospital.

“I was so relieved,” Lauren says.

On Aug. 25, 2017, Lauren underwent lung cancer surgery at MD Anderson’s Texas Medical Center Campus. The surgery went smoothly, and Lauren was declared cancer-free.

That same day, Hurricane Harvey made landfall. Lauren and her mom looked out the hospital window onto Houston’s flooded streets.

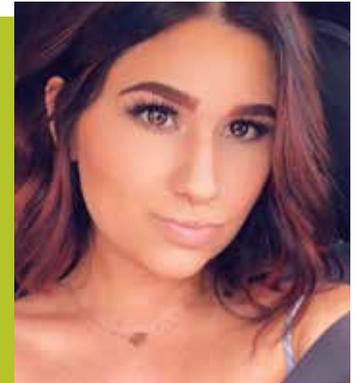
“Outside of the hospital, it looked like chaos, but inside, everything ran smoothly,” Lauren says. “The staff was constantly checking to make sure we were comfortable.”

Seven days later, Lauren and her family returned home, happy to leave both lung cancer and Hurricane Harvey behind them.

Today, Lauren is taking classes at Tarrant County College and making plans to transfer to a larger school next year. She returns to MD Anderson every six months for follow-up scans.

Lauren says she feels lucky. “I’ve been given a second chance,” she says.

*A longer version of this story originally appeared on MD Anderson’s Cancerwise blog.*



patients and survivors with various forms of vascular disease.

Thoracic surgeons are also part of MD Anderson's Lung Cancer Moon Shot, a comprehensive program that aims to dramatically reduce lung cancer deaths.

## Making inoperable surgeries possible

Often the recoveries outlined for patients dealing with thoracic cancers can be high-risk and come with long recoveries or uncomfortable side effects. At MD Anderson, we focus on minimizing those and getting our patients back to their everyday lives as quickly as possible. In some cases, our thoracic surgeons even have the expertise necessary to perform surgery on cancers that elsewhere have been deemed inoperable.

Take our treatment for early-stage esophageal cancer patients. Until recently, patients with esophageal cancer were treated with esophagectomy, removal of the affected part of the esophagus and surrounding lymph nodes, followed by reconstruction. Barrett's esophagus with high-grade dysplasia, which carries a substantial risk of progressing to cancer, was treated the same way. However, esophagectomies lead to significant lifestyle changes, including diet limitations and an inability to sleep horizontally. The operation itself can be dangerous for some older patients.

At MD Anderson, we've incorporated new modalities in the diagnosis, treatment, and prevention of esophageal cancer. Among the new treatments is the use of local therapy administered endoscopically to remove early-stage tumors or dysplastic cells while preserving the esophagus.

"Around 2007, we began a program here at MD Anderson of performing local therapy for early esophageal disease," said Wayne Hofstetter, M.D., a professor and the director of the esophageal surgery program in Thoracic and Cardiovascular Surgery. "We perform ablation for precancerous conditions and

endoscopic mucosal resection followed by ablation for early-stage cancers."

Esophageal cancer is known for advancing quickly and silently. Research suggests that this may be because some cases of esophageal cancer that appear to be early stage are actually late stage and advancing through the blood stream. Now Hofstetter and others are studying early-stage esophageal cancer, in search of genetic mutations that serve as biomarkers of advance disease, as well as looking at how immunotherapy and surgery can be used together to lead to longer survival.

The esophageal surgery program has brought focus to first-line strategies in managing esophageal cancer and continues to seek better up-front choices for patients with early disease. "Our first shot at cancer is our best shot," Hofstetter says.

## Looking for lung cancer's Achilles' heel

Thoracic and Cardiovascular Surgery has a robust research program to explore the cellular and molecular mechanisms of thoracic cancers. The translational research done here helps us treat thoracic cancers with a deeper understanding and enables us to bring our patients the latest in treatment.

One of its lead scientists and a pioneer in gene therapy is Jack A. Roth, M.D., professor and director of the W.M. Keck Center for Innovative Cancer Therapies at MD Anderson. He was among the first to identify and characterize a number of tumor suppressor genes for lung cancer and discover a way to deliver them to cancer cells using nanoparticles.

"I'm constantly looking for the Achilles' heel of lung cancer," Roth says. His research focuses on identifying vulnerabilities within lung cancer.

Thanks to the MD Anderson Lung Cancer Moon Shot and Lung Cancer SPORE Program, MD Anderson is home to one of six patient-derived xenograft centers.

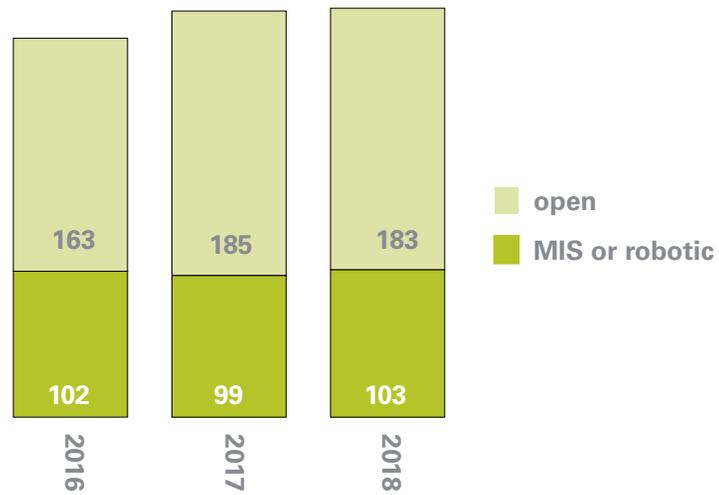
In addition to conducting translation research, our lung cancer surgeons are studying the latest in lung cancer treatment to bring our patients the greatest outcomes. In a randomized clinical trial referred to as Neostar, Boris Sepsis, M.D., is evaluating immune checkpoint inhibitors in patients with operable early-stage non-small cell lung cancer. In this trial, patients receive one or two checkpoint inhibitors before resection.

"We believe that checkpoint inhibitors given during the six-week period before tumor resection can induce a major pathological response in a substantial proportion of patients," Sepsis says. "Moreover, our hope is that this treatment paradigm can train the patient's immune system to recognize the tumor antigens while the tumor is still present and potentially induce a durable response."

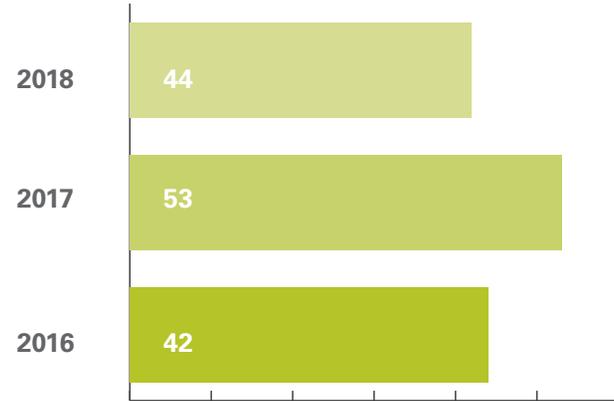
In a similar study referred to as Lonestar, we're hoping to learn if local consolidation treatments including surgery and/or radiation plus ipilimumab and nivolumab (two types of immunotherapy) is more effective than ipilimumab and nivolumab alone in treating patients with metastatic non-small cell lung cancer who have not previously received immunotherapy.

# Volumes

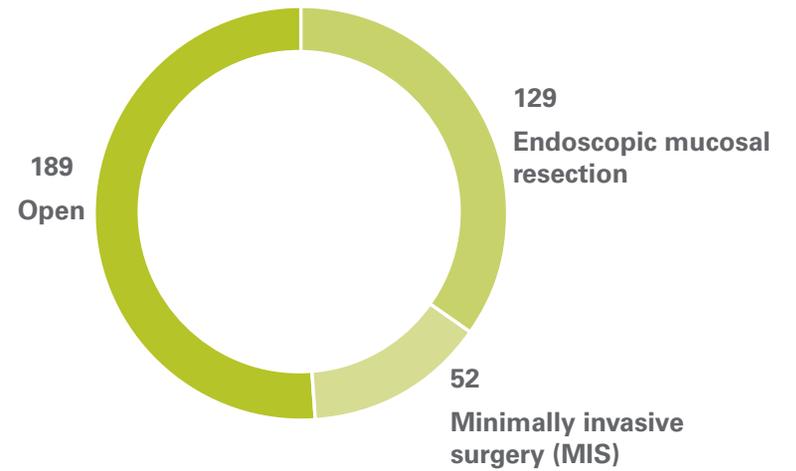
**Primary lung resection volumes  
Fiscal Years 2016-2018**



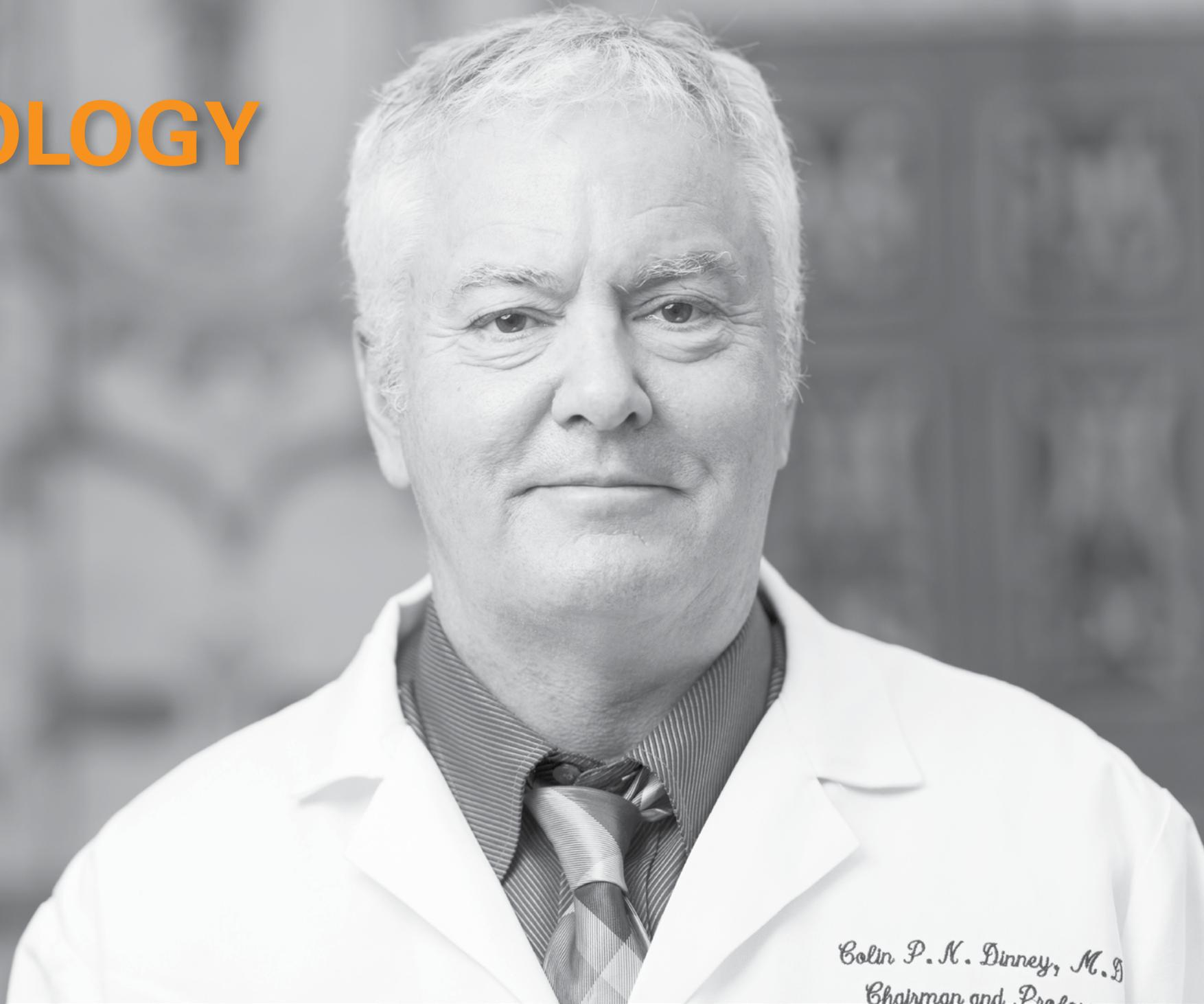
**Chest wall resection volumes  
Fiscal Years 2016-2018**



**Esophageal procedures volume  
Fiscal Years 2016-2018**



# UROLOGY



Colin P.N. Dinney, M.D.  
Department chair

© Adolfo Chavez

*Colin P.N. Dinney, M.D.  
Chairman and Professor*

**U**rology at MD Anderson treats genitourinary cancers with exceptional care, helping to lessen the impact on patients and improve outcomes for cancers like prostate, bladder, kidney, testicular, penile, urethral and adrenal.

Our urologists also treat conditions such as:

- Erectile dysfunction
- Benign prostatic enlargement
- Urinary incontinence
- Kidney stones
- Uro-gynecologic disorders
- Benign urologic tumors

Urologists primary treatment modalities include:

- Complex open surgery
- Minimally invasive surgery
- Multidisciplinary therapy
- Robotic surgery

“We provide advanced care to patients, providing active surveillance, treating localized to locally advanced and complex diseases, and successfully performing high-risk surgeries that no one else will do,” says John Davis, M.D., professor and head of the Urosurgical Prostate Program.

“Every treatment plan pays careful attention to quality-of-life issues, and consideration of how the normal body functions and approaches to maintain those functions.”

## Our multidisciplinary programs

Urology treats a breadth of tumor types through our specialized cancer programs. Each program works with various disciplines, including medical oncology, radiation oncology, pathology and other surgical specialties, to provide the highest level of care. Urology also has a Urinary Tract and Pelvic Reconstruction Program to manage pelvic conditions that affect genitourinary function, because of

cancer treatment or non-urologic cancer therapies.

The Kidney Cancer Program in Urology treats patients with unique minimally invasive surgery techniques, such as laparoscopic, robotic, kidney-sparing and multi-organ surgery. Collaborating across disciplines, Urology doctors are leaders in setting neoadjuvant and adjuvant standards for the treatment of advanced and metastatic disease.

The Bladder Cancer Program’s robust group performs all types of urinary reconstructions, and many include using advanced robotics. With a comprehensive team approach, each patient receives a personalized care plan. Surgeons also use the latest bladder cancer detection techniques. Blue light cystoscopy causes the cancer to fluoresce, and narrow-band imaging improves visibility of critical structures so surgeons can remove tumors without damaging healthy organs, tissue or functions.

## An individualized approach to treating prostate cancer

Urology has one of the most active prostate cancer programs in the country. In Fiscal Year 2018, its team of five doctors saw over 1,800 new patients and consults, performed 700 radical prostatectomies and over 1,200 prostate biopsies in MD Anderson’s Genitourinary Cancer Center. Prostate cancer specialists also see patients at MD Anderson in the League City, West Houston and Sugar Land.

Our urologists also treat prostate cancer with exceptional care, helping to lessen the impact of the therapies on patients and improve outcomes.

When prostate cancer is discovered, surgery is often the best treatment option. Surgeons in Urology use the latest technologies to treat patients with prostate cancer. In fact, MD Anderson treats the

## Forever grateful after prostate cancer surgery

by Kellie Bramlet Blackburn

Billy Brown was having trouble sleeping. At a recent trip to his urologist, the then 57-year-old had learned that his elevated prostate-specific antigen, or PSA, levels, meant that he had prostate cancer. The urologist said there was no need to do anything. They could just keep an eye on things, watch and wait and see. But for Billy, the unease that came with waiting kept him up at night.

His wife, a nurse, urged him to do something about it. So Billy talked with his urologist. “What would you do if you were me?” he asked.

His urologist told him that if he was considering prostate cancer surgery, he would go to MD Anderson, not far from the Houston suburb, Sugar Land, where Billy lives. So Billy scheduled an appointment.

At MD Anderson, Billy met with John Davis, M.D., a urology surgeon. Davis told Billy they could continue to keep an eye on the cancer or they could remove it through surgery. Billy opted for the second option.

On Feb. 16, 2015, Davis performed a robot-assisted radical prostatectomy and robot-assisted bilateral pelvic lymph node dissection to remove the cancer and the surrounding lymph nodes, ensuring that it wouldn’t spread.

“He did an unbelievable job,” Billy says. “I’m just amazed at the success of it.”

Billy spent two days in the hospital before heading home. Each day, the pain decreased a little. In six weeks, he was back at work.

Now to raise awareness and funds for prostate cancer research, Billy helps host a golf and clay-shooting tournament followed by a live auction dinner each year.

“I’m forever grateful to MD Anderson for all that they’ve done for me,” he says. “I’m really thankful MD Anderson is right here in Houston.”



highest volume of patients in Houston with robotic-assisted prostatectomy and is in the top 10% of robotic prostate surgery nationally. They have also pioneered techniques in extended template pelvic lymph node dissection, a procedure to improve the staging of the tumor and increase curative outcomes.

Prostate cancer specialists treat each patient based on their needs, creating specialized plans for each individualized patient. Specialists work with various disciplines, including medical oncology, radiation oncology, pathology, radiology and other surgical specialties, to provide the highest level of care. Within the department the program also has a Urinary Tract and Pelvic Reconstruction Program to manage pelvic conditions that affect genitourinary function, as a result of cancer treatment or non-urologic cancer therapies. The prostate cancer program provides services to evaluate, diagnose and monitor patients at risk for cancer. Its diagnostic services use innovative imaging techniques such as transrectal ultrasound-guided prostate biopsy, Artemis (Eigen) MRI-Fusion biopsy, UroNav TRUS guided fusion biopsy, and transperineal stereotactic ultrasound to find cancer in its earliest stages.

When prostate cancer is discovered, patient counseling is of utmost importance. When surgery is considered, the best-tailored treatment option is identified based on clinical study results. Surgeons in Urology use the latest technologies to treat patients with prostate cancer. In fact, MD Anderson treats the highest volume of patients in Houston with robotic-assisted prostatectomy and is in the top 10% of robotic prostate surgery nationally. We have also established techniques in extended template pelvic lymph node dissection, a procedure to improve the staging of the tumor and increase curative outcomes.

The prostate cancer program has pioneered the approach of active surveillance in the management of early-stage and low-grade prostate cancer. This is a method of close monitoring of prostate cancer with intervention only in those men whose disease demonstrates the ability

to progress and/or put the patient at risk of metastases or prostate cancer-related mortality. This approach has lowered the rates of men receiving therapy in the absence of a clear benefit from the treatment, and has successfully identified men who could avoid treatment altogether.

## Outreach

Urology has supported outreach and clinical care in underserved minority populations including African American, Hispanic and Asian men for over 15 years, starting with the community-based Prostate Outreach Project (POP) that fostered prostate cancer education and early detection throughout the Harris County area. Our goal has been to improve prostate cancer outcomes among African Americans and the underserved by studying both clinical and biologic correlates of aggressive disease.

Under the leadership of Curtis Pettaway, M.D., Urology professor and POP medical director, POP has educated and screened over 44,000 men. Working with our Pathology colleagues, we have a database over 500 African American men who have undergone radical prostatectomy at our center to study pathologic correlates of aggressive disease. The Urology department supports Pettaway's National Cancer Institute-funded cooperative grant (U54) along with investigators from the University of Puerto Rico evaluating the influence of West African Ancestry on the incidence and aggressiveness of prostate cancer among African American (AA) and Puerto Rican populations (POPCAP study). As a result of our experience, we offer state-of-the-art personalized care to the underserved in addition to novel clinical trials targeting this patient population.



## A targeted approach

Our Urology faculty also pioneered focal therapy and targeted prostate biopsy more than a decade ago, under the direction of John Ward, M.D. and Louis Pisters, M.D., both Urology professors. Developing better prostate cancer imaging through MRIs and fusion biopsy allows MD Anderson urologists to better diagnose and risk stratify prostate cancer so we can tailor therapy to the individual. Using technologies such as cryoablation, high-intensity focused ultrasound and interstitial laser ablation, MD Anderson is studying the potential for prostate organ preservation while still treating clinically significant prostate cancer. With nearly 2,000 targeted biopsies now completed, we are prepared to reach beyond standard prostate cancer therapies to develop innovative approaches to each man's disease state.

## Integrated prostate cancer management

The group is also leading the way in establishing new treatment paradigms for men with advanced disease. MD Anderson is a premiere center for clinical trials,

incorporating multimodality approaches such as systemic therapy (neoadjuvant, presurgical and adjuvant) in combination with radiation and surgery to treat the most aggressive cancers. These approaches are establishing new options for men with advanced prostate cancers, informing physician scientists about direct action of drug therapies on prostate cancer and advancing the field by translating these findings to newer therapies. Davis and Brian Chapin, M.D., an associate professor of Urology are the principal investigators on several trials incorporating this treatment strategy. With the recent advances in immunotherapeutic strategies, this platform is being used to investigate new immune-enhancing drugs in prostate cancer, in collaboration with a major pharmaceutical company. The goal is to provide rapid exploration of newer agents with short measures of success to allow for quick assessment and novel approaches.

The department has expertise on the management of men with advanced prostate cancer, focusing on the care of men with local, advanced, and recurrent, but non-metastatic disease. The group approaches each patient with a multidisciplinary team including a urologist, radiation oncologist, and medical oncologist. Genetics counselors and imaging experts are available to provide a complete evaluation when necessary in order to design a personalized treatment plan for men with more aggressive cancers. For men with recurrent disease after primary therapy, access to advanced imaging techniques of PET scan (Axumin, PSMA, C11-Choline) and MRI allow quick assessment and access to advanced therapeutic options. This focus provides a highly innovative approach to prostate cancer management and will establish a foundation for future scientific exploration and care advancement.

## Research

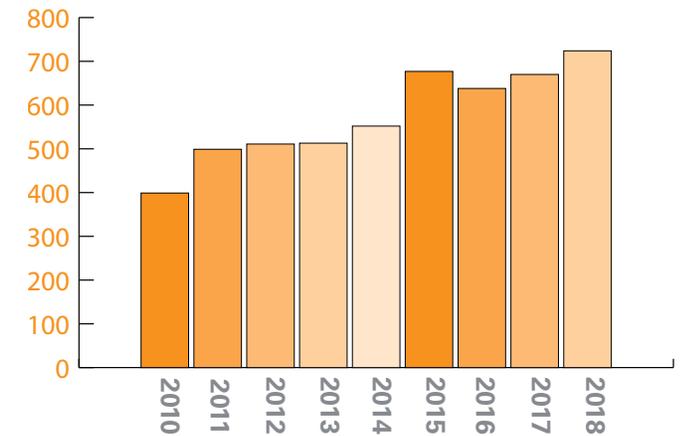
Urology researchers at MD Anderson have a distinct program to study prostate cancer and work closely with their partners in Genitourinary Medical Oncology and Radiation Oncology. The Genitourinary Specialized Program of

Research Excellence (GU SPORE) sponsored by the National Cancer Institute is run by leaders in GU Medical Oncology. Led by principal investigator Christopher Logothetis, M.D., a Urology professor, and co-principal investigator Filippo Giacchetti, Ph.D., this research has made it possible for the group to make significant advances in prostate cancer care.

Another aspect of the GU SPORE includes a career development program to train physician scientists. Under this program, Chapin is supported in his research involving treatment of the primary tumor in metastatic prostate cancer. Initial support supported his Phase 2 trials and the preliminary data which resulted in the team being awarded a Prostate Cancer Foundation Challenge Award. This work is being leveraged into further grant support to continue the analysis of the bio-specimen and tumor samples from patients enrolled in the Phase 2 and 3 studies. The goal of this research is to better define the biologic subtypes of prostate cancers which will help clinicians personalize treatments and therapies specific to individual patients.

The clinical research program under co-direction by Christopher Wood, M.D., a Urology professor, and Chapin creates opportunities to run investigator-initiated trials, partner with industry sponsors and develop a framework for conducting correlative science with the support of various federally and privately funded grants. This work is at the forefront of translational research, taking clinical trial specimens and informing scientists and clinicians about prostate cancer biology.

## Prostatectomy case volume



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Gynecologic Oncology and  
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Head and Neck Surgery

Frederick F. Lang, M.D.  
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Valerae O. Lewis, M.D.  
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