

STRENGTH IN NUMBERS



UNIVERSITY OF KENTUCKY MARKEY CANCER CENTER

Annual Report 2018

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Markey by the numbers





MARKEY IS STRONG TO MAKE OUR PATIENTS STRONGER

The UK Markey Cancer Center has become stronger year after year, and 2018 was no exception. With our world-class doctors, groundbreaking clinical trials, first-rate researchers and expanding philanthropy, we are leading the way to conquer cancer in the Commonwealth and will achieve our goal of significantly reducing cancer incidence and mortality in Kentucky by 2020.

Our commitment to this mission was reaffirmed by the National Cancer Institute this year, as our national cancer center designation has been renewed for the next five years. We remain one of only 70 NCI-designated centers in the country and the only one in Kentucky.

We have also been ranked among the nation's best according to U.S. News & World Report. The UK Markey Cancer Center is No. 38 in America as well as the No. 1 cancer program in Kentucky. Even though our cancer center handles a high patient volume, we still achieve the highest possible 30-day patient survival rate classification.

In addition to providing the best patient care possible, we are dedicated to implementing the most advanced therapies to give our patients the greatest chance at life. Markey became the first cancer center in Kentucky to offer CAR T-cell therapy for adult cancer patients and Lutathera for neuroendocrine tumor patients.

One of the things that will keep our innovative research propelling forward is the opening of the multidisciplinary research building. This new building will unite researchers to focus on Kentucky's most pressing health challenges in an effort to develop solutions to these complex problems.

With our UK Markey Cancer Center Affiliate and Research Networks, we have expanded our reach and expertise across the state. Through this close collaboration, we ensure the highest level of patient care as well as provide greater access to prevention and screening programs throughout Kentucky.

It's through our patients that we see our hard work pay off. We're proud to offer all of our patients high-quality and compassionate care as well as the latest advances in medicine. We use our strength as a cancer center to make our patients stronger.



B. Mark Evers, MD
Director, UK Markey Cancer Center



Sally Humphrey
Chair, UK Markey Cancer Foundation



Michael Delzotti, CFRE
President and CEO,
UK Markey Cancer Foundation

HELPING MARKEY MAKE EACH PATIENT A CHAMPION

Here at the University of Kentucky Markey Cancer Foundation, we're dedicated to championing Dr. Mark Evers and the entire Markey team so that every single patient becomes a champion in the face of cancer.

Cancer is the scourge of Kentucky, and it affects everyone. On average, someone dies of cancer in Kentucky every hour of every day. The Markey Cancer Foundation aims to end this.

To us, the Markey Cancer Center is a destination and a promise. Any patient who walks through our doors will receive world-class care informed by leading-edge science and be treated with dignity and compassion.

The founders of the Markey Cancer Center were driven by a deep sense of obligation to help cancer patients in their time of need in an atmosphere of enlightenment and kindness. They created a place to not only meet crisis head-on but also to celebrate life and learning.

Today, everyone who makes up the Markey Cancer Center upholds this legacy. The doctors and researchers work hard to provide patients and their families with hope. Each of us is also working to discover new solutions for those who may be afflicted in the future.

The Markey Cancer Center depends on philanthropy to support much of its research and all of its patient assistance funds for individuals with limited financial means. When you donate to the Markey Cancer Foundation, you are dedicating funds specifically to battle the disease in your home state.

The high occurrence of cancer in the Commonwealth has emboldened the UK Markey Cancer Center in its mission to erase the disease significantly by 2020. Since our founding in 1982, we as a foundation have been here to support Markey every step of the way, so that every patient can become a champion.

Because Markey is where Kentucky comes to beat cancer.



THE POWER OF ADVANCED MEDICINE AND POWERLIFTING

This world-class powerlifter demonstrated a new kind of strength after coming to Markey to be treated for neuroendocrine tumors

Joe Marksteiner knows strength.

He's been a world-class powerlifter for nearly 40 years and won a world championship in 2013. At 65 years old and 145 pounds, this former gymnast and 22-year Air Force veteran can squat 425 pounds. In October, he and his wife, Cathy – a decorated powerlifter in her own right – were in Mongolia competing for yet another title at the World Powerlifting Championships.

But Joe's strength isn't limited to the raw, physical kind. Last year, he was diagnosed with a small bowel neuroendocrine tumor with metastasis to the liver, a rare disease he'll likely contend with for the rest of his life.

The diagnosis

His symptoms began as minor troubles – some gastrointestinal issues he controlled with diet, his skin flushing red on a regular basis.

A slew of testing by physicians in Cincinnati yielded bad news: Joe had softball and golf ball-sized neuroendocrine tumors in his liver and bowel.

"Your first reaction is, 'Oh crap,'" Joe said. "But I knew there were treatments, there were possibilities, and while it was daunting to go into that, I didn't feel like it was the end of the world."

Coming to Markey

In March 2017, Joe was referred to the UK Markey Cancer Center's Dr. Lowell Anthony, who

specializes in neuroendocrine tumors and cancer. The couple was immediately impressed with how Dr. Anthony talked them through diagnosis and treatment options.

"You can't make informed decisions if you're not educated," Cathy said. "Dr. Anthony not only excelled at educating us, but he did it compassionately and comfortably."

In the past year and a half, Joe has undergone chemotherapies and procedures at Markey to shrink and/or eliminate his tumors. Treatment began with a self-injected octreotide to clear his symptoms. Then came everolimus, an oral chemotherapy. So far, he's had two embolizations of the liver to kill the blood supply to the tumors.

"You can't make informed decisions if you're not educated – Dr. Anthony not only excelled at educating us, but he did it compassionately and comfortably."

CATHY MARKSTEINER

Last December, Markey surgical oncologist Dr. Michael Cavnar performed surgery to resect the root of Joe's problems – a 1.5 centimeter tumor on his small intestine. Additionally, 14 lymph nodes, two of which were cancerous, were removed as were three feet of his small intestine and his gallbladder.

Making progress

For six weeks following this surgery, Joe was given strict orders to lift no more than five pounds at a time.

Once he was cleared for more strenuous exercise, Joe was eager to get back in the groove. He began doing push-ups at home during TV commercial breaks, sometimes doing 100 an hour.

Just six months later, he and Cathy competed in USA Powerlifting Open Nationals, earning their bids for Mongolia. Joe credits his quick recovery to his overall healthy lifestyle, a sentiment Cavnar echoes.

Though he's not quite back to full capacity, Joe said he's feeling good about his progress.

"You know, I'm not 100 percent yet," Joe said. "There have been some distractions and detours, but for the most part I'm back on track from before my diagnosis."

Joe will undergo another embolization to further shrink the metastatic tumors in his liver. He hopes to be able to stop taking his oral chemotherapy someday, although he will need to continue monthly octreotide injections for the rest of his life.

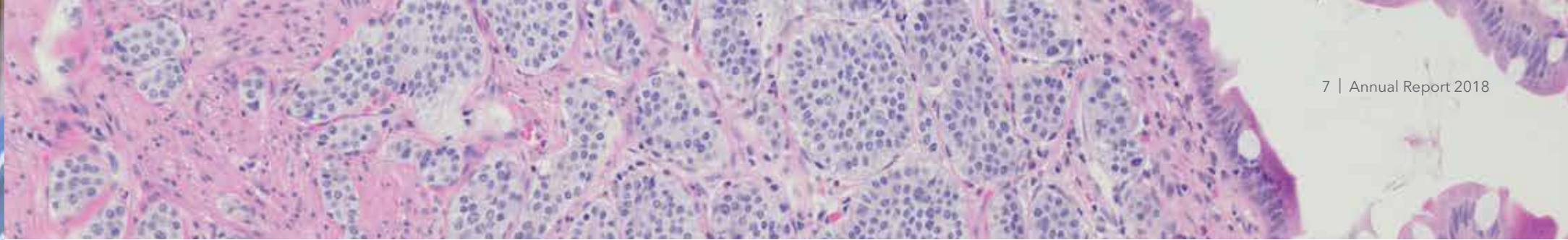
"Dr. Cavnar and Dr. Anthony are very clear – we're probably not going to have 'cure' in our vocabulary, but 'control' is our big 'C' word," Cathy said. "Joe has been able to return to doing something that allows him quality of life. He was a prior world champion, so to be able to return to the world competition stage again is like, 'I can live with this.'"

Joe's international powerlifting comeback was a success: In October 2018 – less than a year after major surgery to resect his tumors – he and Cathy competed in the World Powerlifting Championships in Ulaanbaatar, Mongolia. Joe and Cathy both placed first in their respective age and weight divisions during the competition.





Marcia Roark, center, waits with her husband, Bobby, while a nurse begins an infusion of amino acids to protect his kidneys during treatment. In June 2018, Roark became the first patient at the UK Markey Cancer Center to receive Lutathera, a recently FDA-approved drug for certain neuroendocrine tumors.



NEW HOPE FOR NEUROENDOCRINE PATIENTS

Markey is the first and only cancer center in Kentucky to offer the newly FDA-approved Lutathera®

When Lawrenceburg, Ky., resident Bobby Roark began having some discomfort in his back several years ago, he went to the doctor expecting a run-of-the-mill kidney stone diagnosis.

Instead, the CAT scan showed liver abnormalities that required a biopsy. Roark was then diagnosed with a malignant lung neuroendocrine tumor, which had spread to his liver.

A life-saving treatment option

His local pulmonologist referred him to UK HealthCare, where surgeons decided a resection of the tumors might be too dangerous. He then met with UK Markey Cancer Center medical oncologist Dr. Lowell Anthony, who specializes in these neuroendocrine tumors.

Roark received a combined oral chemotherapy of capecitabine and temozolomide (known as CAPTEM) to shrink his tumors. However, Roark – who has a history of heart problems – had a heart attack shortly after, which led to a transient ischemic attack (TIA), also known as a mini-stroke. He was taken off CAPTEM and given

temozolomide alone, followed by everolimus, which was safer for his heart.

For roughly a year, his cancer remained stable. But in 2016, his tumors began growing again, mostly proliferating in the liver. Despite a hepatic artery embolization to kill the blood supply to the tumors, the cancer continued to grow, and a gallium (Netspot) scan in 2017 showed that his liver was close to rupturing.

Roark was out of options – until earlier this year, when the Food and Drug Administration approved a new peptide receptor radionuclide therapy (PRRT) called Lutathera specifically for neuroendocrine tumors occurring in the pancreas or gastrointestinal tract. Patients who receive this therapy have failed standard of care and/or have cancer that continues to progress.

As one of the first oncologists to run clinical trials with the therapy dating back to 1995, Anthony was eager to bring the therapy to Markey. In June 2018, Roark became the first Markey patient to receive a dose of the therapy.

“I didn’t have anything to lose,” Roark said. “Overall, I’ve done extremely well with it.”

How Lutathera works

Lutathera is a radioactive drug that works by binding to a part of a cell called a somatostatin receptor, which might be present on certain tumors. After binding to the receptor, the drug enters the cell allowing radiation to cause damage to the tumor cells. In other words, the “hot” radioactive drug is encased in a “cold” drug, which allows it to move throughout the bloodstream safely. Once it reaches the tumors, the cold drug wears off and allows the radiation to kill the cancer.

“I don’t think the majority of people in Kentucky appreciate what Markey does here. I can’t say enough good things about Dr. Anthony – he’s been right with me through this whole process.”

BOBBY ROARK

Potential patients are first screened using the Netspot scan to determine whether the therapy will be effective for their type of tumor. Then, therapy is administered in up to four total doses, given once every two months. Prior to receiving the drug, patients receive a four-hour amino acid infusion to protect the kidneys, followed by the 30-minute Lutathera infusion. Because of the active radiation, special precautions are taken while administering the therapy, and patients are given specific instructions around limiting close contact with others for several days.

“Studies show that Lutathera is an extremely effective treatment against these types of pancreatic or GI tumors,” said Anthony. “When it comes to aggressive neuroendocrine tumors, the realistic goal is generally not cure but rather control of the disease and a good quality of life for the patient. As someone who’s been involved in research on this therapy for more than two decades, I’m thrilled that it’s now FDA-approved and that we are able to offer it here at Markey for our patients.”

Markey is the first and only cancer center in Kentucky to offer Lutathera for certain neuroendocrine tumors. Anthony expects to see roughly 30 to 40 patients a year who may be eligible for the therapy.

Meanwhile, Roark continues to do well – he’s already back to working every day and has so far completed three rounds of Lutathera. He was grateful to have access to such a new therapy so close to home.

“Until you have the need, I don’t think the majority of people in Kentucky appreciate what Markey does here,” Roark said. “I can’t say enough good things about Dr. Anthony – he’s been right with me through this whole process.”

World-renowned care, leading-edge science

After being treated for Stage 4 pancreatic neuroendocrine cancer, Amanda Lockey of Jackson, Mississippi, wanted to contribute to the fight against this disease. In 2015, she founded the Amanda W. Lockey Foundation, which aims to advance medical research related to pancreatic and neuroendocrine cancers as well as other cancers.

With the Foundation’s first gift given this year, Lockey showed her appreciation to the UK Markey Cancer Center.

Markey’s Dr. Lowell Anthony, a world-renowned neuroendocrine specialist, had tailored a treatment plan and worked with her doctors in Jackson to ensure Lockey received the treatment she needed.

“We quickly learned the entire (Markey) team and cancer center is dedicated to eradicating cancer,” said Lockey. “Everyone made us feel like their No. 1 priority.”

The donation of \$300,000 to the UK Markey Cancer Foundation will support a Phase II clinical trial being carried out by Dr. Anthony’s team.

“It was as though all paths were leading us to Dr. Anthony, and we are so very thankful,” Lockey said.



MARKEY EARNS RENEWAL OF PRESTIGIOUS NCI DESIGNATION

Markey's renewal includes a five-year grant of almost \$11 million to fund research, education, clinical trials and more

The National Cancer Institute has renewed the UK Markey Cancer Center's national cancer center designation for the next five years. Markey remains one of 70 NCI-designated centers in the country and the only one in Kentucky.

"Five years ago, we stood together and declared cancer in Kentucky had a new foe," said UK President Eli Capilouto. "That is a promise we intend to keep, and we are proud to announce further investment in that promise with the renewal of the Markey Cancer Center's NCI designation. The renewal of this transformative designation will enable us to further deliver on our promise to those we serve and heal."

NCI designation renewal

Markey's renewal of its NCI designation includes a five-year grant projected at \$10.8 million to support research, recruitment of faculty, education and clinical trials.

"Earning NCI designation five years ago was both a recognition of our efforts up to that point and a catalyst to do even more research, outreach and clinical care for Kentucky and beyond," said Markey Cancer Center Director Dr. Mark Evers. "With Kentucky still home to the highest cancer incidence and mortality rates in the nation, having access to the research-driven, high-acuity care an NCI-designated center offers is vital to our citizens."

Total research funding to Markey has increased 48 percent in the past five years, while NCI research funding has increased 24 percent. More than \$2 million of NCI funding comes from grants that are only available to NCI-designated cancer centers.

Impact on Kentucky

Since earning its initial NCI designation, Markey has significantly impacted the Commonwealth. Outpatient visits per year have increased more than 35 percent since 2012 and more than 55 percent since 2009.

"Five years ago, we stood together and declared cancer in Kentucky had a new foe. The renewal of this transformative designation will enable us to further deliver on our promise to those we serve and heal."

UK PRESIDENT ELI CAPILOUTO

Other accomplishments include expanding the Markey Cancer Center Affiliate Network from eight members to 20, launching the Molecular Tumor Board to help oncologists choose cancer therapies tailored to each patient, introducing the Markey Cancer Center Research Network as a way for regional hospitals to collaborate on clinical trials, and opening the Precision Medicine Clinic to

Remaining at the top

The UK Albert B. Chandler Hospital is once again the No. 1 hospital in Kentucky, according to the 2018 U.S. News & World Report's Best Hospitals Rankings.

Cancer care was also included in the Top 50 national rankings for the second year in a row. This year's significant move from 50th to 38th is indicative of the UK Markey Cancer Center's continued emphasis on providing exemplary care as Kentucky's only National Cancer Institute-designated center.

"With this ranking and our NCI-designation, this puts us on par with the top major cancer centers in the country, and our patients should feel comfortable that they don't need to go anywhere else to receive the highest quality care," said Dr. Mark Evers, director of the UK Markey Cancer Center .

Additionally at UK HealthCare, Diabetes & Endocrinology moved from 37th to 33rd and Ear, Nose & Throat and Orthopaedic Surgery & Sports Medicine both ranked 45th.

provide patients access to clinical trials.

In the past five years, \$215 million in institutional, state and philanthropic funds has supported recruiting cancer researchers and clinician scientists and building and renovating clinical and research space for oncology research and clinical programs.

NCI designation grants are awarded for five-year periods. Markey will have the opportunity to renew its status and apply for Comprehensive Cancer Center designation, the highest level of NCI



#38

RANKED AMONG THE NATION'S BEST

- No. 1 cancer program in Kentucky
- Highest possible 30-day patient survival
- High patient volume
- Above average nurse staffing
- Endorsed by national organizations including NCI, FACT and Magnet

Learn more about our ranking at usnews.ukhealthcare.com.

To make a referral, contact UK•MDs at 800-888-5533.



A Cancer Center Designated by the National Cancer Institute



SARAH LISTER MEETS DONOR WHO SAVED HER LIFE

Sarah Lister wanted to thank her bone marrow donor the only way she knew how: by throwing a party

When her doctor called her one January evening, Sarah Lister knew it meant nothing good.

Unfortunately, she was right. She had been diagnosed with acute myeloid leukemia.

"The first cry was not the call with the diagnosis," Sarah said. "It wasn't even when they got in there to do the bone marrow biopsy, which does hurt. [I didn't cry] until my doctors came in and said I wouldn't be able to see my children during my treatment."

For more than four months, she remained an inpatient at the UK Markey Cancer Center as she waited for a bone marrow transplant. With no family members as a match, her doctors turned to national bone marrow registries.

A match is found

As the months drew on, Sarah's optimism began to waver.

Finally, in July 2016 – the day after her 46th birthday – a donor was found, and Sarah underwent a successful bone marrow transplant.

"My initial reaction was, 'Who is it, and how do I send a thank you?'" said Sarah, former director of the Lexington Ronald McDonald House. "One of the things I fantasized about that helped get me through my recovery was, 'One day we are going to have the biggest party!'"

'How can you say no?'

One year after the transplant, the bone marrow registry gave both recipient and donor the option of exchanging contact information. Both said yes, and Sarah found out who had saved her life. His name was Thaddeus Kunkel, and he had been a junior neuroscience major at Michigan State University when he joined the registry.

A few months after registering, Thad got a call requesting a preliminary blood test for a potential match.

He was, indeed, a match.

Thad needed to give a solid commitment because if he backed out at the last minute, Sarah could have died from the prep process. Even though he was overwhelmed, Thad said yes.

From stranger to friend

After the donation Thad received an anonymous thank-you letter from Sarah, and he knew he wanted to learn more about the person he had helped.

In March 2018, Sarah gathered her family into her dining room for an important phone call. She called Thad, who by then was 23 and a medical student at the University of Michigan.

"One of the first things we talked about when I came home from my bone marrow transplant was how special it was that there was somebody in the world who was willing to make that sacrifice."

SARAH LISTER

Their conversation ranged from the silly – with Sarah asking Thad if he liked Mexican food and pickles, two foods she had never craved before receiving his stem cells – to the serious.

"You've literally saved my life and changed the life of my children so that they could have a mom to be with them," Sarah told him. "One of the first things we talked about when I came home from

Sarah Lister with her visiting family and friends enjoyed a music therapy session with UK music therapist Jennifer Peyton. At the 2018 Expressions of Courage cancer survivor event, Sarah Lister met her bone marrow donor, Thaddeus Kunkel, who traveled from Michigan to meet Sarah in person.

my bone marrow transplant was how special it was that there was somebody in the world who was willing to make that sacrifice."

Celebrating together

Sarah wanted to thank the young man in person. She suggested that Thad come to the UK Markey Cancer Center's Expressions of Courage event, an annual celebration of cancer survivorship and he did.

"No way did I ever think this would happen," he said. "It's an experience I'll never forget. If people here aren't on the registry and are thinking about it, it's definitely a good thing to do."

For Sarah, the moment was truly a dream come true. Fighting back tears, she called out the importance of the team around her, thanking the Markey nurses and doctors who continue to care for her, as well as her personal support system at home.

But Thad's generosity is the biggest reason she's still here today.

"Despite having an amazing team of family, friends, coworkers and so many people who are here today, not one of them could do what this man did to save my life," she said. "And I am forever grateful."

Dr. Gerhard Hildebrandt and Dr. Hayder Saeed lead the CAR T-cell initiative at UK Markey Cancer Center, the first program in Kentucky to offer the therapy.

MARKEY NOW OFFERING LIFE-SAVING CAR T-CELL THERAPY

This FDA-approved immunotherapy for lymphoma patients is a promising option when other therapies fail

The UK Markey Cancer Center is the first hospital in Kentucky approved to offer Yescarta®, the first FDA-approved CAR T-cell therapy for adults with diffuse large B-cell lymphoma, the most common type of non-Hodgkin lymphoma.

CAR T-cell therapy is a type of immunotherapy where the patient's own immune system is used to fight back against cancerous cells. At Markey, this therapy will be used specifically for patients whose cancer has not responded to standard treatment, including chemotherapy and bone marrow transplantation.

"CAR T-cell therapy is one of the most powerful and promising immunotherapies available, and we are thrilled to be able to offer this life-saving treatment here in Kentucky," said Dr. Mark Evers, director of the UK Markey Cancer Center. "As the only National Cancer Institute-designated cancer center in the state, it's our responsibility to bring innovative therapies like this to our patients, allowing them to receive the latest, greatest cancer care without having to cross state lines."

How it works

T-cells are a type of white blood cell used by the immune system to fight off infection and disease. During CAR T-therapy, T-cells are taken from a patient's blood and modified in the laboratory. During this process, a receptor called chimeric antigen receptor (CAR) is placed in the outside wall of the T-cells.

When modified T-cells are infused back into the patient, these cells lock onto cancer cells using a "key – keyhole" approach, where their new receptor binds to a specific structure on the cancer cells. This allows the T-cells to kill cancer cells in a very targeted way.

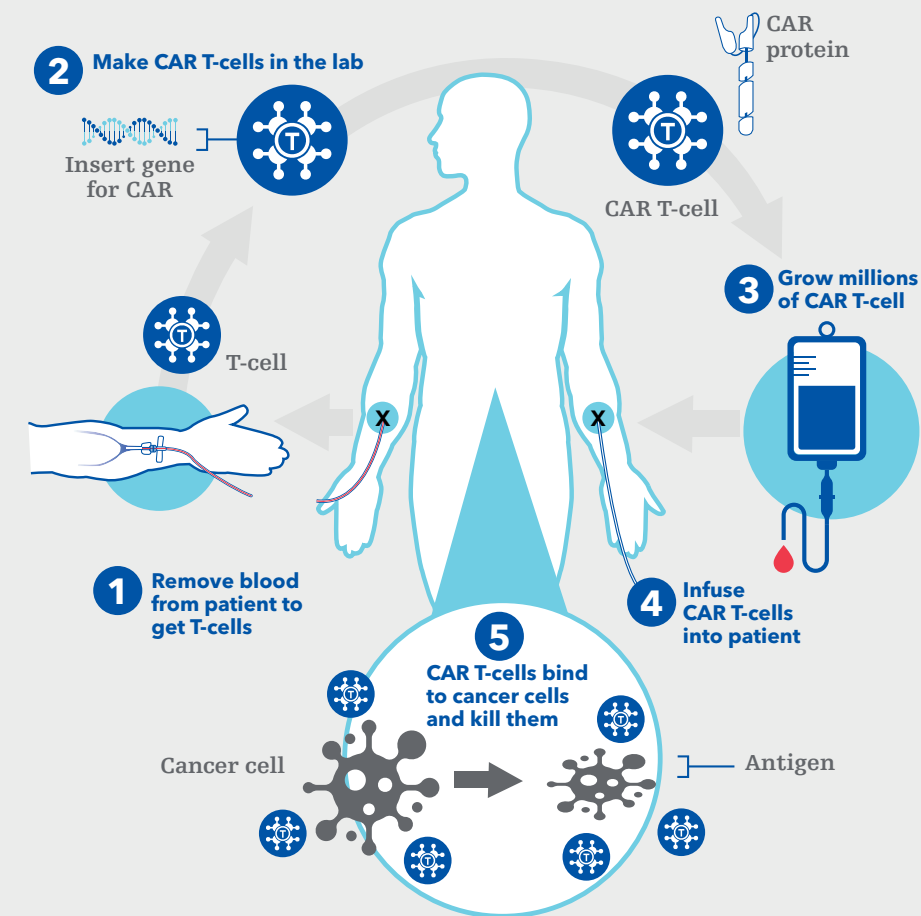
"CAR T-cell therapy is very promising – you can really bring about a complete remission in patients who have failed several other lines of treatment."

DR. GERHARD HILDEBRANDT

"Unlike allogenic bone marrow transplantation, where you use cells from the immune system of another person to fight the cancer and run the risk of the donor immune system attacking the patient's organs, CAR T-cell therapy uses the patient's own cells," said Dr. Gerhard Hildebrandt, division chief of Hematology and Blood and Marrow Transplantation at UK. "Essentially, we're taking the patient's immune cells and equipping them with the tools to fight back against their own cancer."

Rescue therapy

The new therapy offers hope for those who have failed the standard of care for diffuse large B-cell lymphoma and would have otherwise only very limited options. The results for Yescarta are impressive for these patients: 54 percent achieved remission and 52 percent were alive at 18 months,



CAR T-cell therapy is a type of treatment in which a patient's T-cells are genetically engineered in the laboratory so they will bind to specific proteins (antigens) on cancer cells and kill them. (1) T-cells are removed from the patient's blood. Then, (2) the gene for a special receptor called a chimeric antigen receptor (CAR) is inserted into the T-cells in the laboratory. The gene encodes the engineered CAR protein that is expressed on the surface of the patient's T-cells, creating a CAR T-cell. (3) Millions of CAR T-cells are grown in the laboratory. (4) They are then given to the patient by intravenous infusion. (5) The CAR T-cells bind to antigens on the cancer cells and kill them.

Source: cancer.gov

based on the ZUMA-1 trial published in the *New England Journal of Medicine* last year.

Although the treatment is effective, it does come with the possibility of side effects. The most significant side effect is cytokine release syndrome, a general inflammatory response in the body and toxicity to the brain. Most cases are mild, but occasionally these reactions can be life-threatening. Therefore, patients receiving CAR T-cell therapy will be carefully screened prior to and monitored closely following their treatment.

Hildebrandt notes that the therapy isn't currently approved as a first-line option for treatment, but rather a "rescue" when the standard of care has failed the patient. However, he states that this powerful new immunotherapy is currently being studied for earlier use in this disease and other cancers.

"CAR T-cell therapy is very promising – you can really bring about a complete remission in patients who have failed several other lines of treatment," Hildebrandt said. "It's a very big step in treating cancer in the future, and it will probably change how we treat our cancers across different fields within the next few years."

Yescarta is the first CAR T-cell therapy Markey will be offering. Several other immunotherapies targeted at various blood cancers are in the pipeline for the cancer center.

New UK policy gives medical leave to bone and organ donors

To give generous bone and organ donors more peace of mind, UK enacted a new leave policy for full-time employees: Employees will receive five days paid medical leave for donating bone marrow or 30 days for donating a solid organ (kidney, partial liver or partial lung).

At the Markey Cancer Center, physicians perform around 110 bone marrow transplants each year. For patients dealing with blood cancers, receiving bone marrow may be their only option for survival. A bone marrow donor can expect to take from one to seven days until they feel normal again.

"Implementation of this medical leave policy is a fantastic step in the right direction, as it will help UK donors to fulfill their goal, which is to help and possibly provide the only chance for a cure to our patients and to patients around the globe," said Dr. Gerhard Hildebrandt, division chief for Hematology and Blood and Marrow Transplantation.

CANCER SURVIVOR MAKES A DIFFERENCE FOR PATIENTS STATEWIDE

After two cancer diagnoses, Jack Hillard is not just a survivor – he’s an advocate for more research and detection measures, especially in his home state

Kentucky native Jack Hillard was no stranger to hospitals growing up. His early patient experiences spurred an interest in healthcare and led him to a career path that allowed him to make an impact in the lives of other patients.

“Nearly all of my career has been spent at the intersection of healthcare and politics,” said Hillard. “I was working for a congressman right out of college when I was hired by University of Kentucky HealthCare as a fundraiser, and I worked there for more than a decade.”

Hillard also worked in similar positions at Harvard Medical School, Louisiana State University and the Kentucky Blood Center. It wasn’t until he faced his own battles with cancer that Hillard realized just how important efforts to raise money for research, early detection measures and treatments are.

His diagnoses

Hillard was diagnosed with large granular lymphocytic (LGL) leukemia in 1993. Then in 2004, a routine colonoscopy revealed that Hillard had colon cancer. In both instances, Hillard benefited from early diagnosis. Surgery eliminated the colon cancer, and regular medication therapy has kept his leukemia in check for more than 25 years.

“I owe so much to the whole team at Markey Cancer Center,” he said. “I am so grateful to them for catching both cancers early.”

After his own experiences, Hillard was determined to give other Kentuckians the same shot at a positive outcome.

“Around 26,000 people in Kentucky are diagnosed with cancer each year – that’s among the highest rate in the U.S.,” he said. “I learned that so many of those cancer cases can be prevented.”

The Kentucky Cancer Foundation

Six years ago, Hillard and some of his fellow Markey patients launched the Kentucky Cancer Foundation, a small nonprofit that helps bring much-needed funds and attention to the state’s cancer epidemic. The Foundation collaborates with members of the Kentucky Cancer Consortium, a group of more than 70 organizations, including Markey, to help ease the burden of cancer in the state through fundraising and legislation.

To date, the Foundation has lobbied for and helped provide more than \$3 million to support screening and early detection measures for colon cancer, the second most common cancer in the state. More recently, the group lobbied for the largest tobacco tax increase in Kentucky history.

“By combining my two passions – fundraising and politics – I figured out how to impact big issues, and cancer is a big issue in Kentucky,” said Hillard. “We’ve focused our efforts on colon cancer screening thus far, and we are seeing a shift in the trajectory. Screening rates are improving. I’m



happy to be part of the team making this change happen.”

The Patient Advisory Group

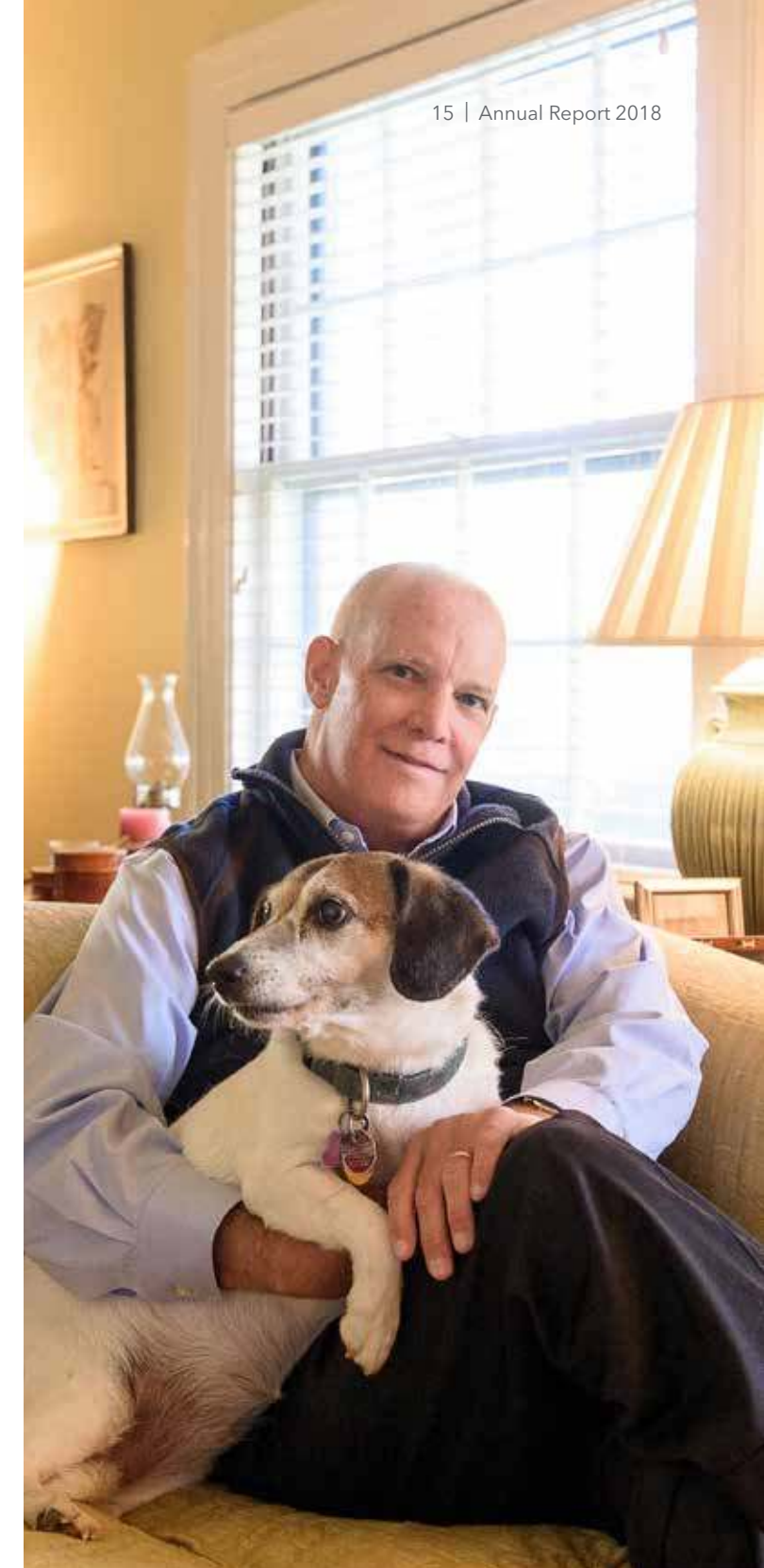
As a member of the Patient Advisory Group at Markey, Hillard meets monthly with fellow patients and hospital leaders to gain insight into current healthcare trends and to advocate for thousands of patients like himself.

“I owe so much to the whole team at Markey Cancer Center. I am so grateful to them for catching both cancers early.”

JACK HILLARD

“I think it takes a lot of courage for people to tell their life stories in such a public way, but Jack has never been shy about sharing the ups and downs of his cancer journey,” said Terry Keys, cancer education liaison at Markey. “He uses them as a springboard to advocate for more research, better treatments and patient-centered care.”

Hillard has left a lasting mark on the organization, according to his oncologist Dr. Greg Monohan. “When you have an opportunity to care for patients like Mr. Hillard and you see how successful and committed he is, it inspires me and other oncologists to continue to do what we’re doing.”



Jack Hillard and his best friend, Gracie, were united in 2004 as a gift of “canine therapy” from then-Markey nurse Norma Childers.



INITIATIVES INSPIRE KENTUCKIANS TO TAKE CHARGE OF HEALTH

Two education programs teach youth and people with disabilities how their decisions affect their well-being and risk for cancer

One of the UK Markey Cancer Center's most important goals is to educate as many people as possible about cancer prevention in an effort to decrease the high rates of incidence and mortality across the state. The cancer center is doing just that through two new cancer education programs curated specifically for youth and individuals with disabilities in Kentucky.

Both outreach initiatives use Markey's Get Fit, Be Smart, Don't Start program as a foundation. The program tackles a myriad of cancer prevention topics, including nutrition, exercise, smoking, tanning bed use, addiction and screenings, and provides general health and wellness information. Using interactive displays, in-person presentations and educational tools tailored to each population, the programs help participants understand how decisions now can affect their health, including their chances of getting cancer, later in life.

"If your cell phone quit today, you would run as fast as you could to whatever store you needed and have it fixed. But if you start feeling bad, you should have the same passion to fix your body. Your body is not replaceable, so we need to take good care of it and pay attention to it," said Melissa Hounshell, Markey Cancer Center community outreach director and curriculum creator.

Youth Health Ambassadors Program

What makes this program particularly impactful is that adults don't teach the curriculum: Students do.

After presenting the Get Fit, Be Smart, Don't Start program in classrooms across Kentucky for several years, Hounshell came up with the idea to have the students themselves teach their peers about the importance of cancer prevention. So she reached out to the Highlands Health System in Prestonsburg, Ky., – a Markey affiliate – and set her concept in motion.

"By using these high school students who are well-respected and known in their communities, we can reach more kids and explain the importance and value of good health and wellness throughout their lives," said Hounshell. "So many times younger kids follow the lead of their parents or grandparents. But often, especially in Kentucky, the adults aren't taking good care of themselves. So we're trying to change that cycle to make our health a priority throughout life."

To begin the Youth Health Ambassadors Program pilot, Markey and Highlands selected six motivated, health-conscious Kentucky high school juniors from a pool of applicants and trained them on the program's curriculum. The students then reached out to their former elementary, junior high and high school teachers to set up presentations in their classrooms.



One of the pilot program's participants, Jaxson Ratliff, a Johnson Central High School junior, is well aware of the state's high rates of cancer but hopes to gain a better understanding of the health issues in his area of Eastern Kentucky.

"By training these high school students who are well-respected and known in their communities, we can reach more kids and explain the importance and value of good health and wellness throughout their lives"

MELISSA HOUNSHELL

"I applied for the program in order to bring health education to our area and educate people on topics that are absolutely crucial to their health," Ratliff said. "I can be a voice and an advocate for change in an area where change is feared sometimes, and I believe this starts with the youth."

At the end of their senior year, these peer advisors will receive a scholarship to put toward their future education – possibly continuing their journey to share cancer prevention education and starting a career in the medical field, as Ratliff aspires to do.

Inclusive Health Program

In another partnership for cancer prevention education, Hounshell and the Markey Cancer Center Community Outreach Team are collaborating with the UK Human



Students from Johnson Central High School and Prestonsburg High School, Trey Layne, Jaxson Ratliff, Alexis Click, Alexia Hall, Alison Campbell and Sarah Thompson, participated in the ambassador training at Highlands Regional Medical Center. Alexia Hall, an ambassador from Prestonsburg High School, presented to students at Prestonsburg Elementary.



GET FIT. BE SMART. DON'T START.

WE WILL MAKE HUNDREDS OF DECISIONS EACH DAY.

What to wear? What to eat? What to say?

Some decisions are more important than others and can have a lasting effect on your life. Being the best YOU takes time and effort, and you are certainly worth it.



Melissa Hounshell, Markey's community outreach director, and Morgan Turner, HDI's health education specialist, presented at Cypress Community Services in Lexington in September 2018.

Development Institute (HDI) to roll out the Inclusive Health Program, which is mindfully adapted from the Get Fit, Be Smart, Don't Start curriculum. The program is geared specifically toward adults with varying disabilities across the state. There is a high need for cancer prevention education among this population because people with disabilities experience cancer, stroke, diabetes and heart disease three times more often than the general population.¹

"Over 33 percent of adults in Kentucky have some type of disability¹ – one of the highest rates in the nation – and they're not getting the attention they need as far as health and wellness education, like understanding the importance of getting a mammogram, a Pap test, a colonoscopy or other prevention measures," said Hounshell.

The Health and Wellness Initiative team within HDI works to raise awareness of health disparities, including helping individuals with disabilities and their support networks take charge of their health. Hounshell will be presenting the Inclusive Health Program in community organizations across the state along with co-facilitator Morgan Turner, who is HDI's health education specialist and has a disability.

"There are immense disparities among individuals with disabilities when it comes to cancer screening," said Megan Jaspersen, health and wellness coordinator at HDI. "Our biggest goal for this program is to speak directly to individuals with disabilities and educate them on the

importance of advocating for themselves with the doctor, asking about these screenings and taking a proactive role in their own health."

Both teams are excited about this new and important Inclusive Health Program and plan to expand the initiative to provide regular statewide cancer screening events specifically for individuals with disabilities. They also have high hopes for the initiative's impact on cancer incidence and mortality rates among this population of Kentuckians.

"We want to create a culture of more engagement and more advocacy for good health, which will, in turn, foster partnerships between the disability community and the health community," said Lindsey Mullis, health and wellness program director at HDI. "Our goal is for individuals with disabilities to take better care of themselves and we, as health professionals, can do a better job of taking care of them. This is an incredible opportunity to start that conversation."

Reference

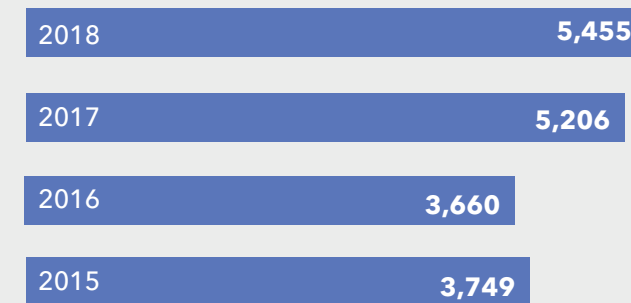
1. Centers for Disease Control and Prevention. Disability and Health Data System (DHDS). www.cdc.gov/ncbddd/disabilityandhealth/dhds/index.html. Accessed September 11, 2018.

Markey outreach by the numbers

Community outreach events by fiscal year

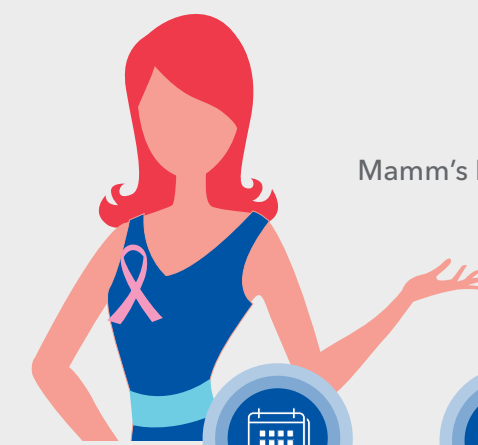
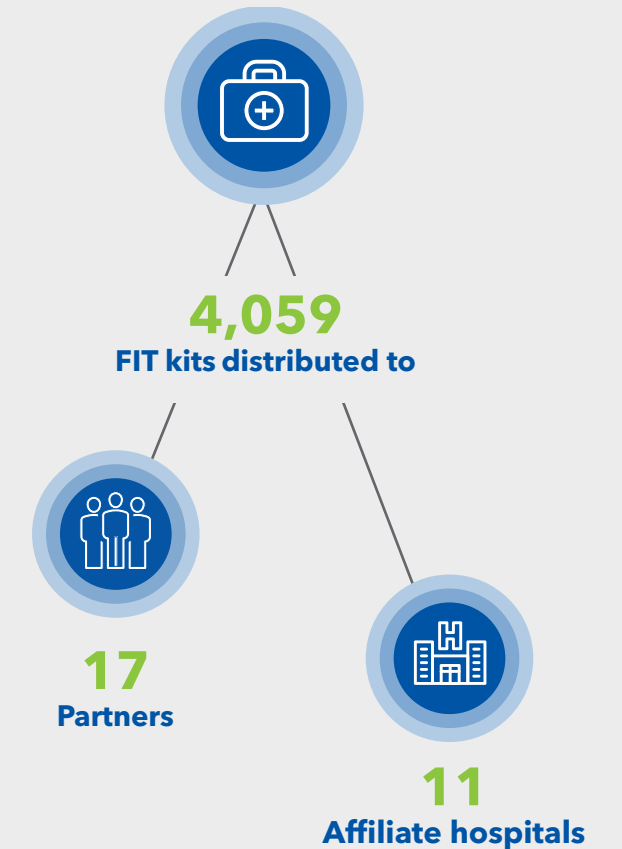


People reached through community outreach by fiscal year



Making an impact on colon cancer outreach

November 2015 - October 2018



Mamm's Day Out event, a community screening for breast cancer

March 2017 - June 2018
(Six Saturday screening events)





TWO DRUGS PROTECT BREAST CANCER PATIENTS' HEART FUNCTION

A new study tested two classes of drugs in conjunction with Herceptin, which was created to treat the aggressive HER2-positive breast cancer

A multicenter NCI-funded study examined the effectiveness of two drugs used to prevent heart problems resulting from breast cancer treatment.

"This data is the crucial first step toward establishing a new standard of care to reduce the risk of cardiotoxicity for patients undergoing treatment for HER2-positive breast cancer," said study chair Dr. Maya Guglin of the UK Gill Heart & Vascular Institute.

Herceptin's success comes at a cost

The chemotherapy drug Herceptin was created to treat an aggressive form of breast cancer called HER2-positive. However, its stunning success at reducing cancer recurrence and improving survival came at a cost: One in four women who receive the drug develops potentially dangerous heart problems. Physicians began suspending

Herceptin treatment or reducing frequency of treatment if a patient's ejection fraction, a measure of the heart's ability to pump blood, dropped below 50 percent.

This study is the largest trial on this topic, with 167 sites enrolling 468 patients. The multi-arm, placebo-controlled study explored whether two classes of drugs – ACE inhibitors and beta blockers – preserved a patient's cardiac function during chemotherapy. The study looked at patients who were treated with Herceptin alone as well as patients who were treated with Herceptin after receiving another chemotherapy drug, doxorubicin.

"These patients are already anxious about their future," Guglin said. "We don't want to avoid this exceptionally effective treatment just because it might cause damage to the heart."

Dr. Maya Guglin of the Gill Heart & Vascular Institute chaired a landmark NCI-funded study that demonstrated the value of adding beta blockers or ACE inhibitors to some chemotherapy regimens for HER2-positive breast cancer.

The study's findings

The data showed that neither ACE inhibitors nor beta blockers had an effect on the rate of cardiotoxic events on patients receiving Herceptin alone. However, there was a significant reduction in cardiotoxicity for patients on beta blockers or ACE inhibitors who received doxorubicin before Herceptin.

"The data clearly demonstrated that for patients with HER2-positive breast cancer taking both doxorubicin and Herceptin, adding either an ACE inhibitor or a beta blocker to the treatment regimen can significantly offset the chance of heart problems," Guglin said.

"In the past few decades, we've made huge strides in successfully treating cancers that used to be very deadly for patients."

DR. MARK EVERS

Studying how to prevent these negative side effects is an important contributor to providing optimal patient care.

"In the past few decades, we've made huge strides in successfully treating cancers that used to be very deadly for patients," said Markey Cancer Center Director Dr. Mark Evers. "It's important to also think about the patient's future and to help them maintain the best possible quality of life. This study provides valuable information for oncologists who are treating patients with HER2-positive breast cancer and may help shape the new standard of treatment for this cancer in years to come."



NEW SPACES REFLECT MARKEY'S DEDICATION TO PATIENT CARE AND RESEARCH

The cancer center has built four new spaces to serve the needs of its patients

Over the past year, the UK Markey Cancer Center has expanded and built new spaces to better treat its patients as well as to encourage doctors' pursuit of vital research.

These four new areas mark the next step in UK HealthCare's mission to provide patients with the latest advances in cancer care in an environment carefully designed to promote healing.

Eleventh floor of Chandler

Markey's doctors will now also take care of patients on the 11th floor of UK Albert B. Chandler Hospital Pavilion A. The space, which opened up in December 2017, includes the Darley Blood & Bone Marrow Transplant Unit, a 32-bed unit dedicated to bone marrow transplant and patients with blood cancers. This floor also houses the James F. and Gay G. Hardymon Patient Care Unit, a 31-bed unit for medical and surgical oncology patients.

The space is designed with patients and their families in mind, as hospital stays can last for months at a time. The floor includes laundry facilities and a comfortable family room for caregivers and families.

Integrative medicine

In April 2018, UK HealthCare opened a new clinic space in Markey's Whitney-Hendrickson Building to house its expanding Integrative Medicine & Health program.

Integrative medicine focuses on the whole person by using appropriate therapies and drawing from various disciplines to achieve optimal health and healing.

In the clinic, providers offer the following individual services for patients, caregivers and employees: acupuncture, Jin Shin Jyutsu, massage therapy, narrative medicine and reiki. Group classes offered through the clinic include yoga, meditation, tai chi, journal workshop and Jin Shin Jyutsu self-help.

Research facility

A research facility expressly devoted to addressing and eradicating the state's most significant health disparities opened in September 2018. The \$265 million facility will bring together basic scientists, clinicians, engineers and behavioral scientists to address the state's most pronounced health issues. Kentucky is among the nation's leaders in deaths from numerous health conditions, including cancer.

"We are breaking down walls and silos, putting together researchers across many disciplines and approaches, and, importantly, bringing new talent to the institution to work in this bold new setting," said Lisa Cassis, UK's vice president for research. "This is what it will take as we set our sights on reducing the heavy burden of cancer, cardiovascular diseases and stroke, diabetes and obesity, and substance abuse."

Ultimately, some 500 scientists, principal investigators, and graduate and undergraduate students will work in the unique facility, which brings together experts across disciplines around the idea of more quickly developing solutions and getting them into communities where they can make a difference. The complex of interconnected facilities will create a synergy of efforts in health, pharmacology, basic research and behavioral sciences.

Radiation oncology

A new radiation oncology integrated brachytherapy suite with a CT-on-rails and linear accelerator replacement is currently under construction. Due to an increase in radiation medicine volumes and complexity, as well as aging equipment, this suite will better accommodate the unique needs of Markey's patients.

The project is scheduled to be complete in summer 2019.

FACILITY PHOTOS, LEFT TO RIGHT:

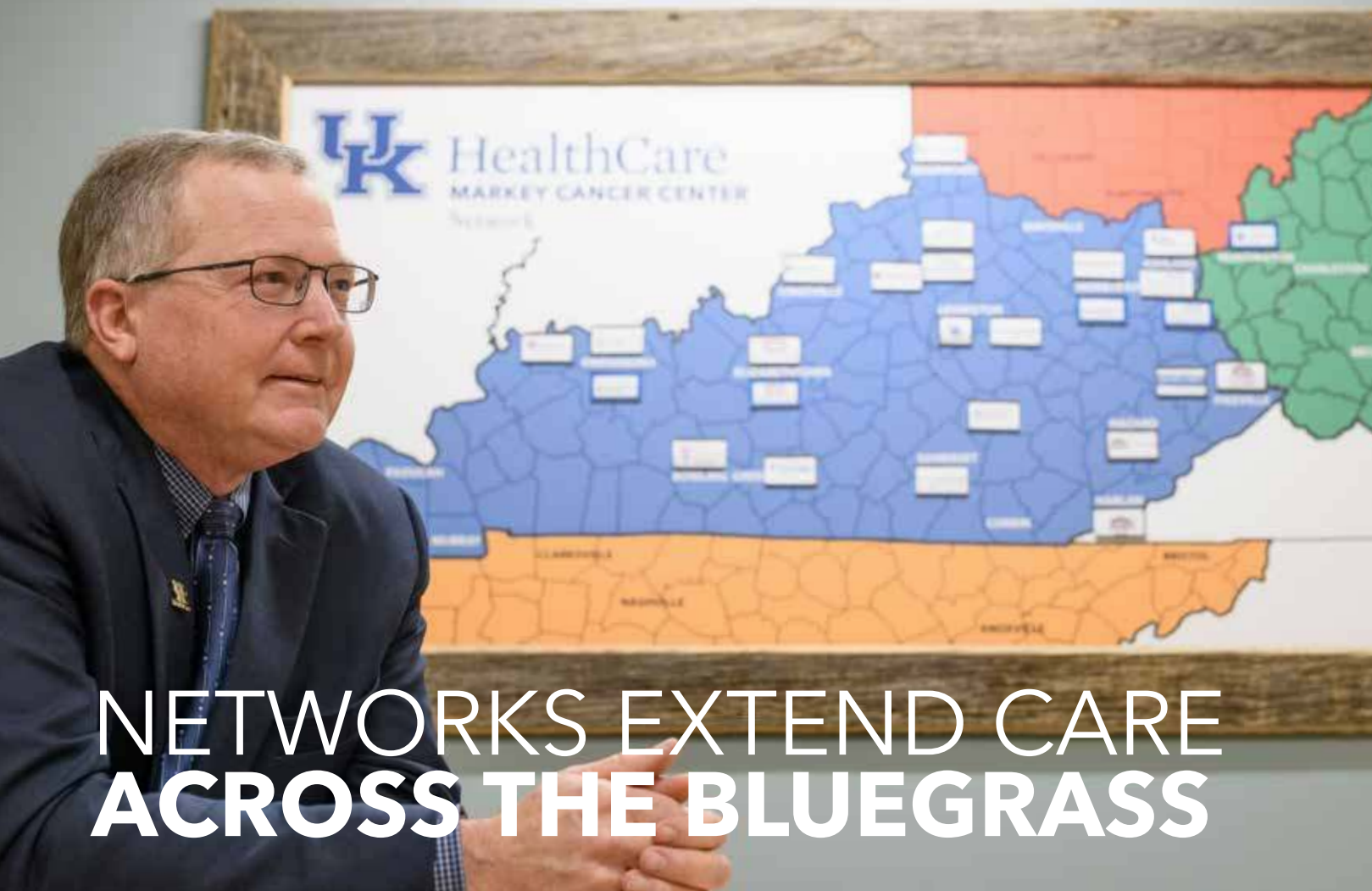
An example of one of the 63 rooms in the UK Markey Cancer Center inpatient unit on the 11th floor of the Albert B. Chandler Hospital.

The yoga room is one of the many healing spaces available to patients in the UK Integrative Medicine & Health Clinic.

Each of the research labs in the new space is set up as a neighborhood to foster interdepartmental collaboration.

Our new radiation oncology spaces will provide greater capacity for our growing practice.





NETWORKS EXTEND CARE ACROSS THE BLUEGRASS

Dr. Tim Mullett aims to reduce Kentucky cancer burden through Affiliate, Research Networks

Tim Mullett, MD, MBA, FACS, joined UK HealthCare in 1996, helping to form UK Markey Cancer Center's first full thoracic oncology practice. Since 2015, Dr. Mullett has served as medical director for the UK Markey Cancer Center Affiliate and Research Networks, which help ensure that high-quality cancer care is readily available to patients across the region.

We talked with Dr. Mullett about what inspires his work, the Networks' impact on the region and his vision for growth in the future.

What inspires you as a physician?

By working with patients in the early stages of this disease, I can give them their best chance to beat it. Seeing patients come back is truly

inspirational, and seeing someone who is four, five or 10 years out from cancer surgery is pretty exciting.

The other thing that has been fascinating is the evolution of multidisciplinary care. Seeing patients progress through treatment with fewer side effects, better outcomes and longer, fuller lives has allowed me to see cancer care in the bigger picture.

How has the growth of Markey's Affiliate and Research Networks impacted Kentucky?

The Affiliate Network was started in 2006 with three affiliate programs. With Cheri Tolle's leadership through the years, we have now grown to 20 programs. Since starting the Research

In his home woodshop, Dr. Tim Mullett created the UK Markey Cancer Center Network map that hangs in the network offices.

Network with Kris Damron in 2014, we have extended Markey's research to seven programs across the region.

Bringing these programs into our networks helps provide a blueprint of what a high-quality cancer program looks like in terms of early detection, precision medicine resources and assistance with treatment decisions. We are seeing that model embraced, allowing more programs to offer comprehensive care to patients close to home.

What does Commission on Cancer accreditation mean for patients?

In 2015, we made it mandatory for Affiliate Network programs to be CoC accredited. It gave us a reference point to measure programs, as the CoC is the gold standard of cancer accreditation.

We understand that not every cancer program is CoC accredited, and we want to help programs reach that goal. Once they have earned that accreditation, they are equipped to deliver their highest quality cancer care and become an Affiliate Network member.

What is your vision for Markey's Affiliate and Research Networks over the next five years?

We represent more than a third of cancer cases diagnosed in Kentucky. There are specialty treatments here at Markey that are available because we are an NCI-designated cancer center, but I would like to extend that opportunity to our affiliates and their patients.

Our goal is to see the cancer burden in Kentucky reduced by 50 percent. We can achieve that through these networks and by developing early detection programs and changing the culture that has given Kentucky a cancer burden heavier

than any other state. Over the next five years, we aim to expand Markey's reach to as many patients as possible.

What steps are being taken to advance toward that goal?

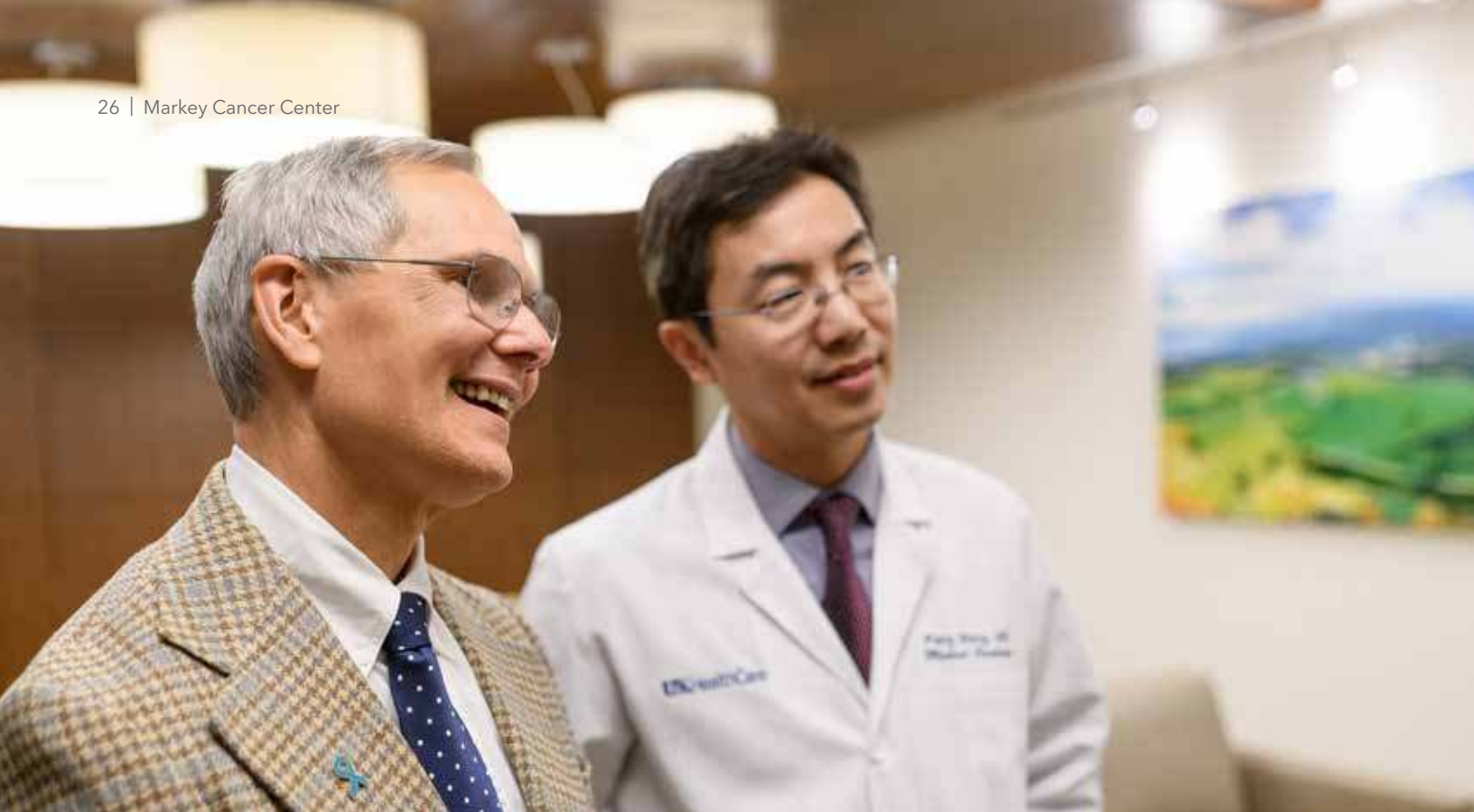
Lung cancer is extremely prevalent in Kentucky. When we started this program, there were only five certified tobacco specialists across the state. Now there are 150 specialists serving areas from Pikeville to Paducah, with the majority belonging to members of our network. Continuing to grow this team of specialists will only help us detect lung cancer earlier and treat patients.

One other area that is changing dramatically is the world of precision medicine. By aligning with the ORIEN Network and Markey's Molecular Tumor Board, network members are able to take advantage of the latest developments discovered for treatment in the precision medicine field.

What excites you most about leading these networks?

The opportunities that the networks present are so exciting. When I have the opportunity to train others, I am amplifying what I can do. Working with residents, fellows and students gives me the chance to extend my own work and cancer care.

By working with programs to create solutions to common problems, we can guide patients to the right place. If they need care close to home, we make it easy for them to get the care they need. If they need precision medicine or a specialty surgery, we want to be available to them. Working with Markey's Affiliate and Research Networks gives me the opportunity to have the biggest impact on Kentucky's cancer burden.



LONGTIME UK PATHOLOGIST, CANCER SURVIVOR **PAYS IT FORWARD**

Dr. Charles Lutz makes a bequest that will support Markey's goal of reducing cancer in the Commonwealth

After being diagnosed with prostate cancer in 2011, Dr. Charles Lutz was inspired to honor the place he works and the place that treated his cancer: the UK Markey Cancer Center. Lutz is the vice chair for research and director of cell and molecular pathology in the UK Department of Pathology & Laboratory Medicine.

This year, Lutz made a bequest of \$100,000 to the Markey Cancer Foundation to fuel its mission of reducing cancer mortality in Kentucky. His future gift will be used to support compassionate patient care and innovative cancer research and treatments at Markey.

"Markey does great work," said Lutz. "I believe in their mission, and I'm part of the mission myself, in both my research and my clinical

work. But I'm also benefiting from the care they provide."

Lutz has been on the Markey pathology team for the past 15 years and focuses his research on cancer immunology. He works in molecular diagnosis and HLA tissue typing in bone marrow transplantation for leukemias and other cancers. When he was diagnosed with prostate cancer, he immediately knew where he would seek treatment.

From pathologist to patient

After undergoing radical prostatectomy under the care of urologist Dr. Stephen Strup, Lutz was treated by Dr. William St. Clair and the radiation oncology team for the cancer that had spread to his pelvis. He underwent several rounds



Dr. Charles Lutz, collaborating with his oncologist Dr. Peng Wang. Radiation oncologist Dr. William St. Clair reviews a cancer case with a fellow to determine precision treatment.

of radiation therapy for the metastasis before enrolling in a clinical trial at the encouragement of oncologist Dr. Peng Wang. The study combined standard androgen deprivation therapy (ADT) and an experimental drug that reduces testosterone production throughout the body. Thanks to this clinical trial, Lutz has been in complete remission from prostate cancer since beginning therapy in November 2015.

"Markey does great work. I believe in their mission, and I'm part of the mission. But I'm also benefiting from the care they provide."

DR. CHARLES LUTZ

"I wasn't afraid of being in a clinical trial, but I was initially worried that the lack of testosterone would make me lose my motivation," he said. "That did not happen. I am loving life. I continue to run and to ride my bicycle to work. This has been the best year of my life, and I am very grateful for the opportunity Dr. Wang offered me to be on the clinical trial."

In addition to saving his life, Lutz's experience with his trial therapy inspired him to create a new clinical trial with his oncologist. In this trial, Lutz and Wang are partnering to study whether testosterone may inhibit the immune system by studying the immune cells in patients before and after they undergo ADT.

"As a patient, Dr. Lutz is very optimistic and full of energy," Wang said. "Even while on treatment that typically causes fatigue, he was still working in his lab and writing grants. As a coworker, he's a great partner and very determined."

Paying it forward

Lutz's gift to the Markey Cancer Foundation is part of the new Calumet Society – a group of donors who make public bequests to the foundation with a declared intent.

"Making an estate gift is not about one's demise; it's about the values they hold and the moral narrative they wish to write," said Michael Delzotti, president of the Markey Cancer Foundation. "This gift is Dr. Lutz's way to live his values out loud and declare his support of the institution at which he works and that he loves."

UK PRECISION MEDICINE CLINIC RECEIVES \$1 MILLION GIFT

The generous pledge will help provide patients access to advanced therapies

For 40 years, the William Stamps Farish Fund has been an involved and generous supporter of some of the most innovative initiatives carried out at the UK Markey Cancer Center. In 2018, the nonprofit reaffirmed that commitment with a \$1 million pledge toward the Precision Medicine Clinic.

“For it is research that helps to ensure that tomorrow will be better than today.”

MICHAEL DELZOTTI

“Through this gift, the Farish Fund continues to demonstrate its commitment to science and the value it represents to the people of Kentucky,” said Michael Delzotti, CFRE, president and CEO of the Markey Cancer Foundation. “For it is research that helps to ensure that tomorrow will be better than today.”

Advanced medicine close to home

The Precision Medicine Clinic is an interdisciplinary clinic within Markey in which physicians, pharmacists, nurses and clinical research staff work collaboratively to provide unparalleled care for patients taking part in early-phase drug trials.

This clinic provides cancer patients from across Kentucky with access to advanced therapies, including early-phase, investigator-initiated clinical trials not available anywhere else in the state; Markey’s Molecular Tumor Board, which provides individualized consultation on cancer genomic sequencing results; and specialized infusion bays for extremely precise drug delivery.



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The UK Markey Cancer Foundation has resources available to those interested in exploring their planned-giving options. Planned gifts can be directed toward research, patient care, or any of Markey’s other cancer-related programs and funds.

For more information or to discuss making a gift to the UK Markey Cancer Foundation, call **859-323-6448**.

NCI SEER PROGRAM

In 2018, the Kentucky Cancer Registry received a \$2.6 million contract from the National Cancer Institute to continue its participation in the NCI's Surveillance Epidemiology and End Results (SEER) program. The contract could be worth up to \$31 million over 10 years.

Housed within the UK Markey Cancer Control Program, KCR serves the state, including investigators at other state institutions and across the country. The Registry catalogs uniform data on nearly 30,000 new cases of cancer in Kentucky citizens annually.

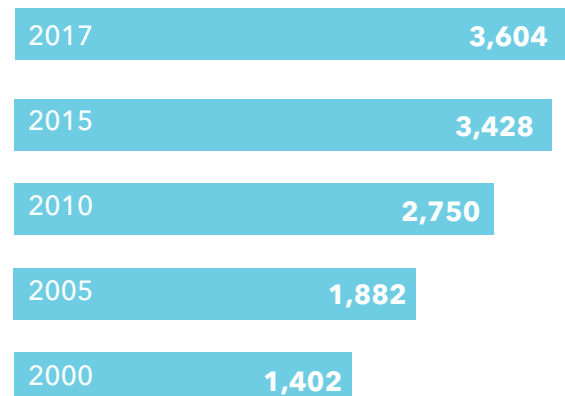
The NCI's SEER program is an authoritative source on cancer incidence and survival. SEER collects and publishes cancer incidence and survival data from population-based cancer registries covering approximately 34 percent of the U.S. population. The data is used by researchers, clinicians, public health officials, policymakers and others.

Access to the resources and technology of the Registry is important for Kentucky researchers and clinicians.

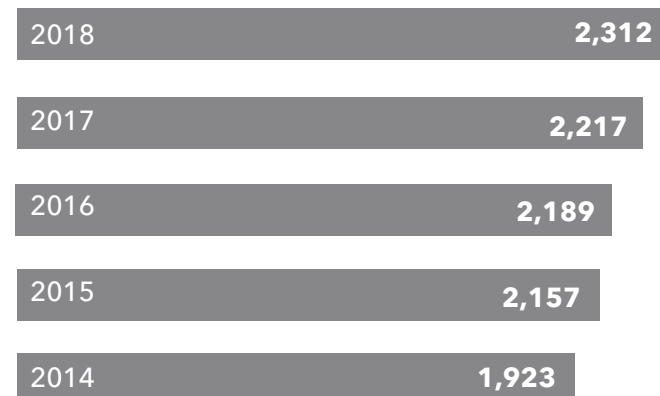
"I firmly believe that advances in biomedical informatics and data science greatly increase KCR's potential to facilitate a sustained reduction in Kentucky's cancer burden," said KCR Director Eric B. Durbin. "With this award, we have a renewed opportunity to strengthen our data and partnerships in order to chart a new course for our state."

MARKEY BY THE NUMBERS

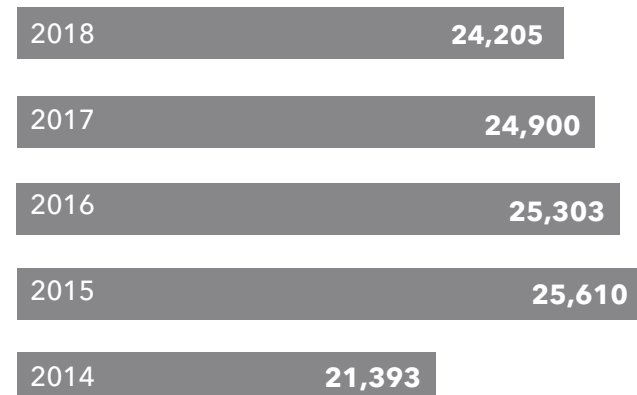
Growth in new cancer cases by calendar year



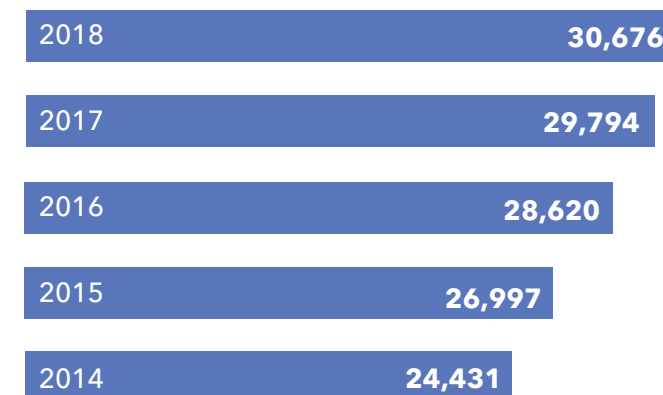
Radiation oncology unique patients by fiscal year



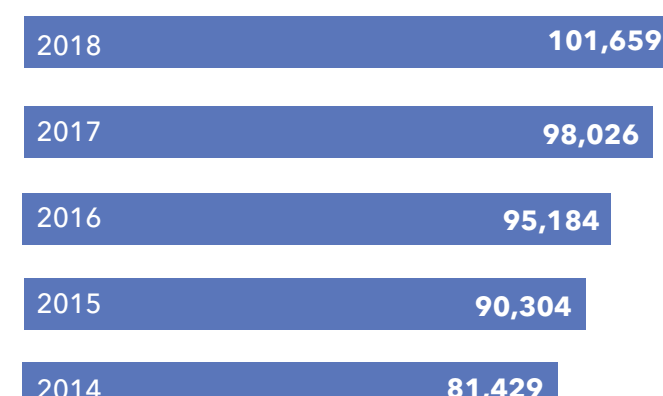
Radiation oncology treatments by fiscal year



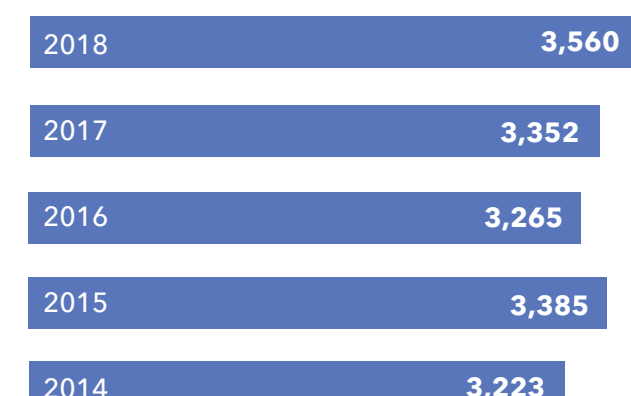
Unique patients neoplasms & hematology by fiscal year



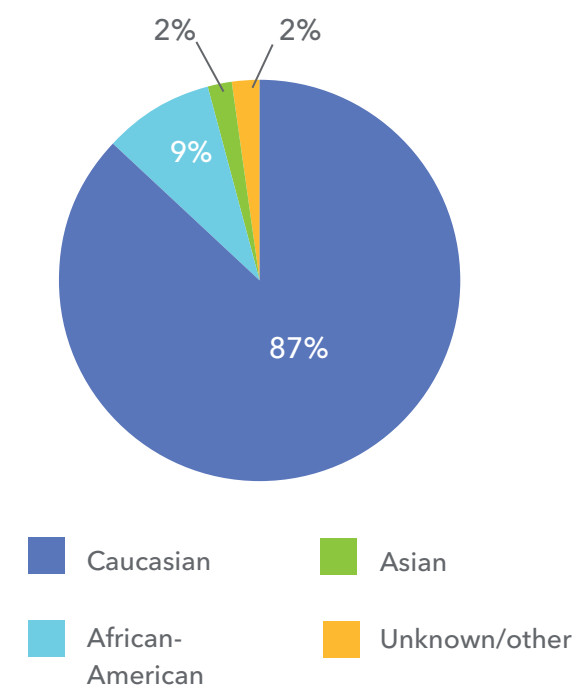
Outpatient neoplasms & hematology visits by fiscal year



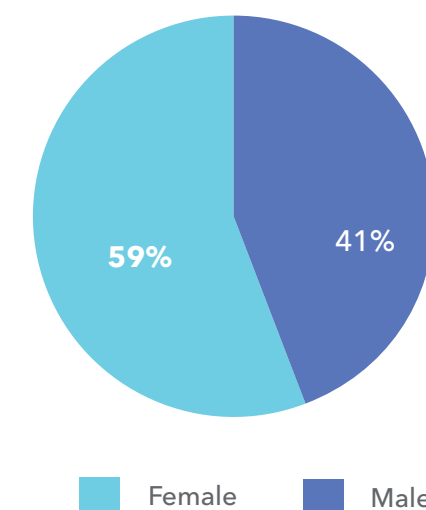
Inpatient neoplasms & hematology visits by fiscal year



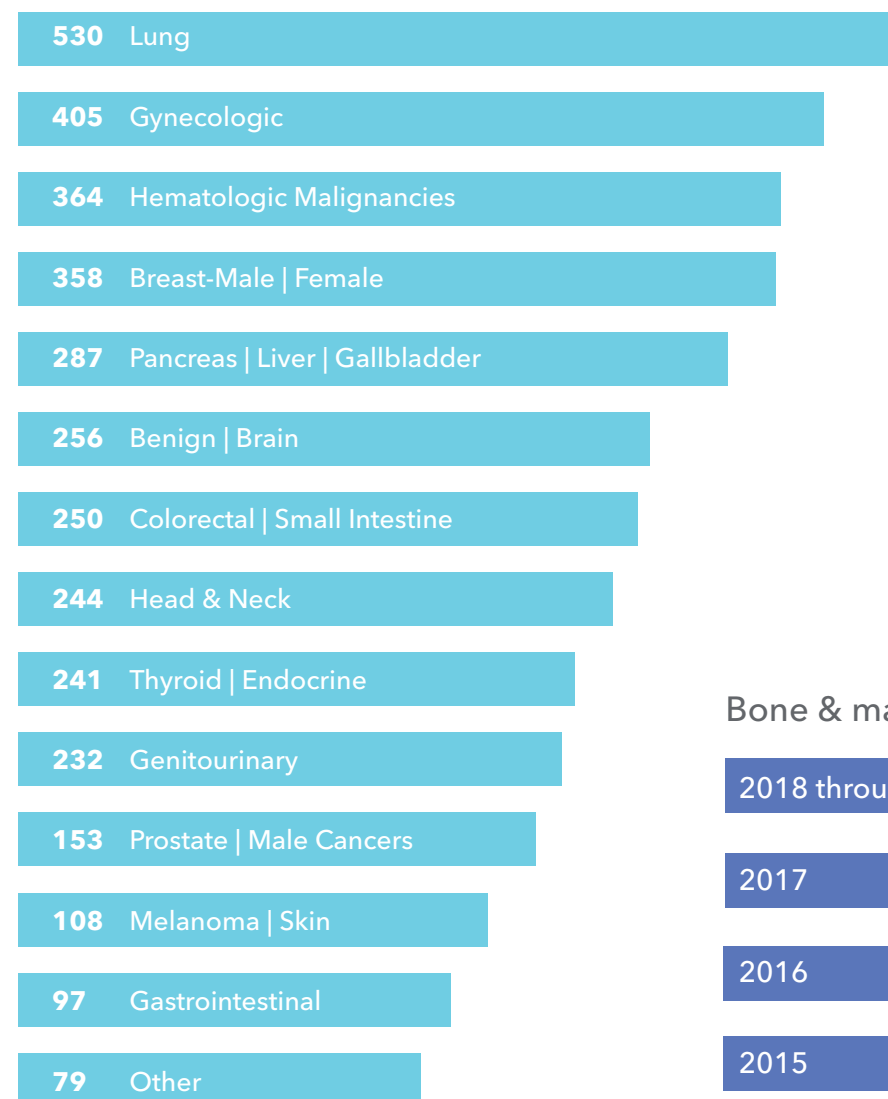
Unique patients by race, fiscal year 2018



Analytic cancer cases by gender, fiscal year 2018

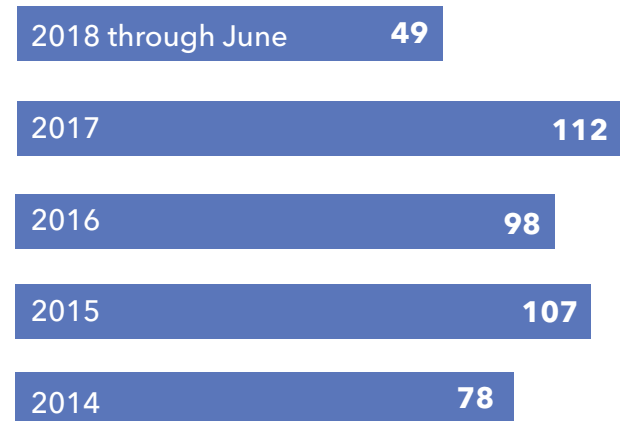


UK Markey Cancer Center cases by tumor site, calendar year 2017



TOTAL 3,604

Bone & marrow transplants, calendar year



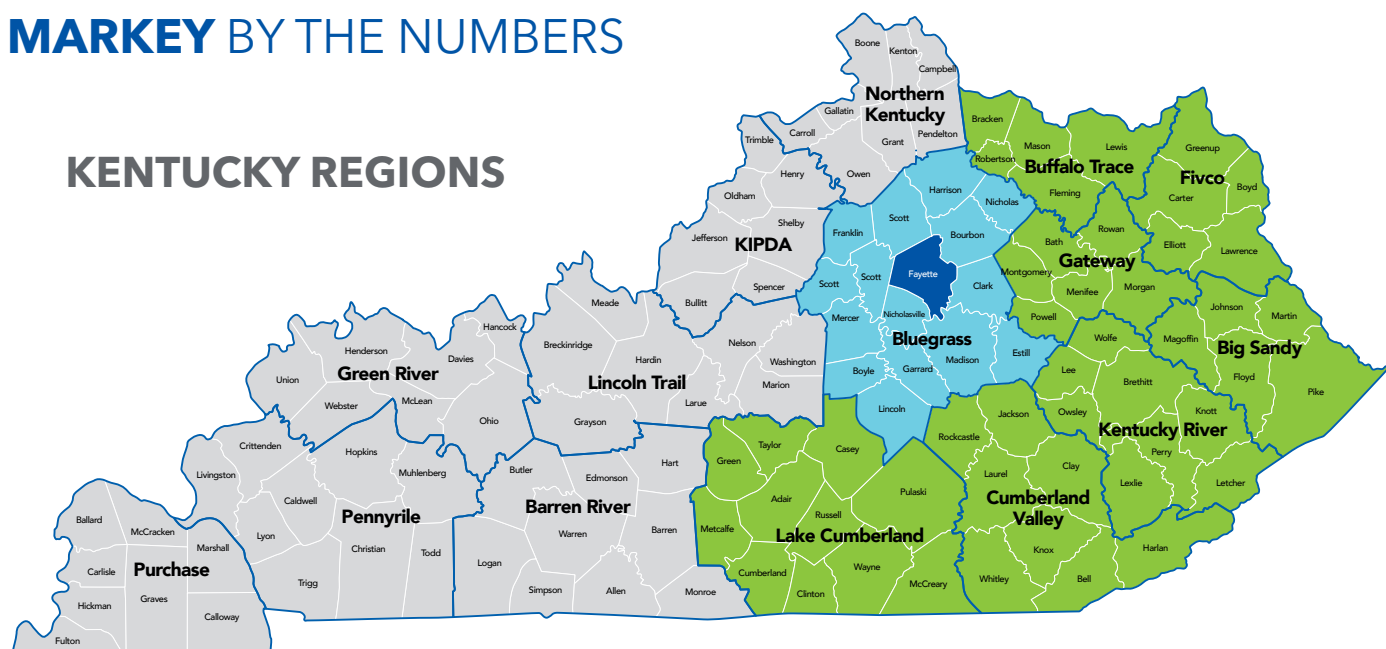
UK Markey Cancer Center Publications, July 2013 to December 2017

Faculty members in the Markey Cancer Center have produced nearly 1,000 publications since Markey became NCI-designated. Many of these publications represent collaborations between researchers in multiple Markey research programs and with research institutions outside of UK, around the country and around the globe.

Research Program	Number of Publications	Publications Involving Collaborations Within a Program	Publications Involving Collaborations Across Programs	Publications Involving Collaborations Programs with Other Research Institutions
Cancer Cell Biology and Signaling	256	24%	39%	57%
Genomic Instability, Epigenetics and Metabolism	178	24%	46%	60%
Drug Discovery, Delivery and Translational Therapeutics	429	21%	26%	53%
Cancer Prevention and Control	293	30%	11%	66%
Total Unique Publications	983	27%	16%	58%

MARKEY BY THE NUMBERS

KENTUCKY REGIONS



Markey Cancer Center visits by Kentucky Region,* inpatient and outpatient by fiscal year

UK HealthCare Market	Area Development District	2014	2015	2016	2017	2018	
Primary	Fayette	27,369	29,375	31,532	31,409	33,681	
Secondary	Bluegrass	26,807	28,719	29,794	31,534	31,391	
Tertiary	Cumberland Valley	6,897	7,707	8,339	8,133	8,597	
	Lake Cumberland	3,927	4,942	4,931	5,217	5,169	
	Kentucky River	3,568	4,569	4,080	4,332	4,841	
	Gateway	3,518	3,537	4,000	3,750	3,570	
	Big Sandy	2,953	3,293	3,114	3,613	3,577	
	Fivco	1,831	2,091	2,351	2,307	2,144	
	Buffalo Trace	1,528	1,926	1,894	2,305	2,662	
Other KY ADDs	KIPDA	1,216	1,235	1,539	1,608	1,751	
	Lincoln Trail	841	1,136	1,301	1,307	1,661	
	Lake Cumberland	355	511	737	1,266	1,137	
	Northern Kentucky	1,145	1,031	1,060	1,000	985	
	Barren River	198	256	296	336	438	
	Green River	214	338	313	348	566	
	Pennyrile	144	115	316	215	226	
	Purchase	91	113	263	208	179	
	Unknown Out of ST	Unknown Out of State	2,050	2,795	2,589	2,490	2,644
	Grand Total		84,652	93,689	98,449	101,378	105,219

*Data includes DX02 adult non-hospice patients | Kentucky Region = Kentucky Area Development Districts (ADD)

UK MARKEY CANCER CENTER AFFILIATE NETWORK

20 MEMBERS

- Clark Regional Medical Center, Winchester
- Frankfort Regional Medical Center, Frankfort
- Georgetown Community Hospital, Georgetown
- Hardin Memorial Hospital, Elizabethtown
- Harlan ARH Hospital, Harlan
- Harrison Memorial Hospital, Cynthiana
- Hazard ARH Regional Medical Center, Hazard
- Highlands Regional Medical Center, Prestonsburg
- King's Daughters Medical Center, Ashland
- Lake Cumberland Regional Hospital, Somerset
- Manchester Memorial Hospital, Manchester
- Methodist Hospital, Henderson
- Our Lady of Bellefonte Hospital, Ashland
- Owensboro Health Regional Hospital, Owensboro
- Rockcastle Regional Hospital, Mt. Vernon
- St. Claire Regional Medical Center, Morehead
- St. Elizabeth Healthcare, Edgewood
- The Medical Center at Bowling Green, Bowling Green
- TJ Samson Community Hospital, Glasgow
- Tug Valley ARH Regional Medical Center, South Williamson



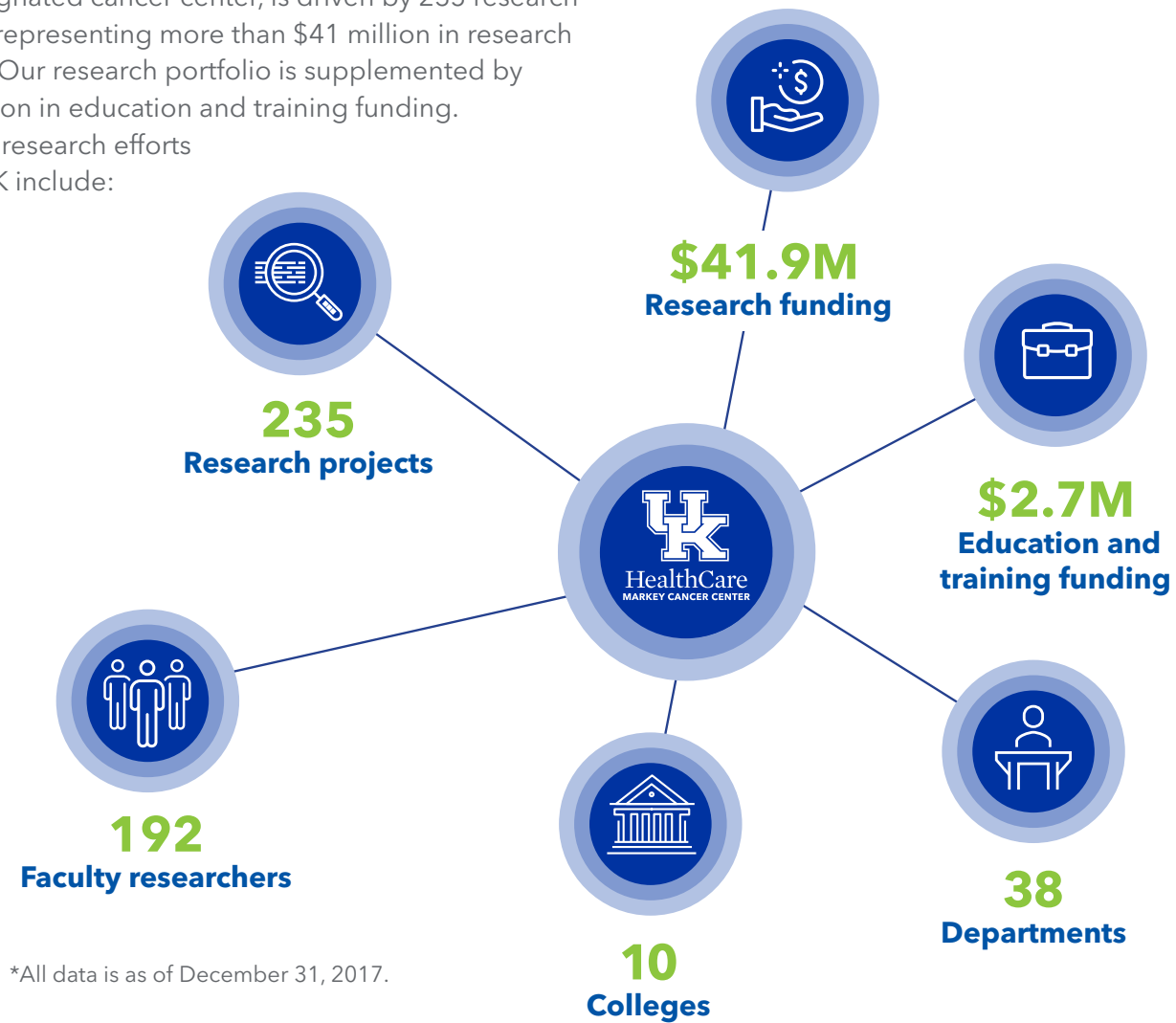
UK MARKEY CANCER CENTER RESEARCH NETWORK

7 MEMBERS

- Hardin Memorial Health, Elizabethtown
- King's Daughters Medical Center, Ashland
- Owensboro Health Regional Hospital, Owensboro
- St. Claire Regional Medical Center, Morehead
- St. Elizabeth Healthcare, Edgewood
- St. Mary's Medical Center, Huntington, WV
- Tri-State Regional Cancer Center, Ashland



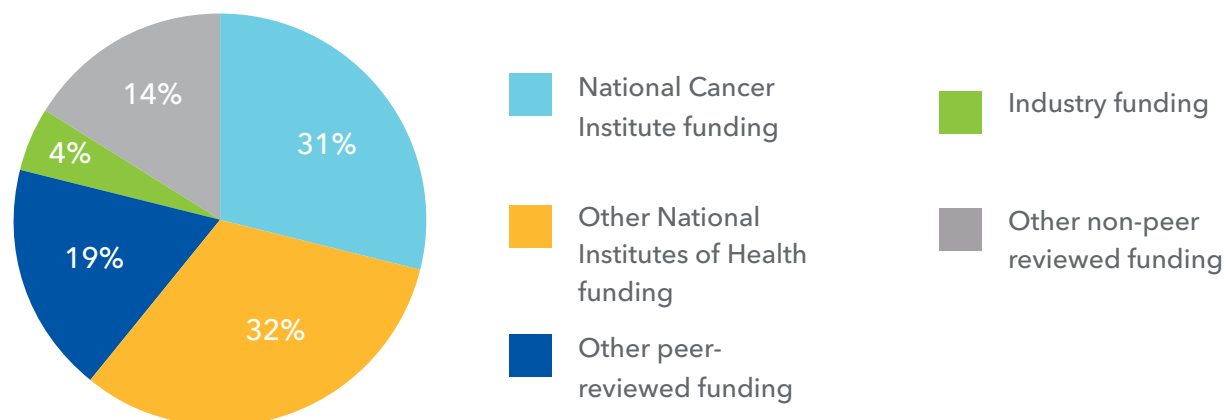
The UK Markey Cancer Center, Kentucky's only NCI-designated cancer center, is driven by 235 research projects representing more than \$41 million in research funding. Our research portfolio is supplemented by \$2.7 million in education and training funding. Markey's research efforts across UK include:



*All data is as of December 31, 2017.

Markey research funding summary: \$41.9 million

(Total costs as of December 31, 2017)



CREDITS

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Manager
Erin McElwain

Editor
Taylor Ysteboe

Designers
Bruce Frank; Tom Tally

Web Editors
Jonathan Coffman; Donna Wheeler

Photographers
Mark Cornelison; CJ Cruz; Bruce Frank; Melissa Hounshell; Shaun Ring; Timothy Mullett, MD

Writers
Jonathan Coffman; Holly Ford; A. Kate MacDougall; Olivia McCoy; Allison Perry; Ami Piccirilli; Jen Roytz; Taylor Ysteboe

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UK Markey Cancer Center Mission

To reduce cancer mortality in our region through a comprehensive program of cancer research, treatment, education and community engagement with a particular focus on the underserved population of Kentucky and Appalachia.

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