

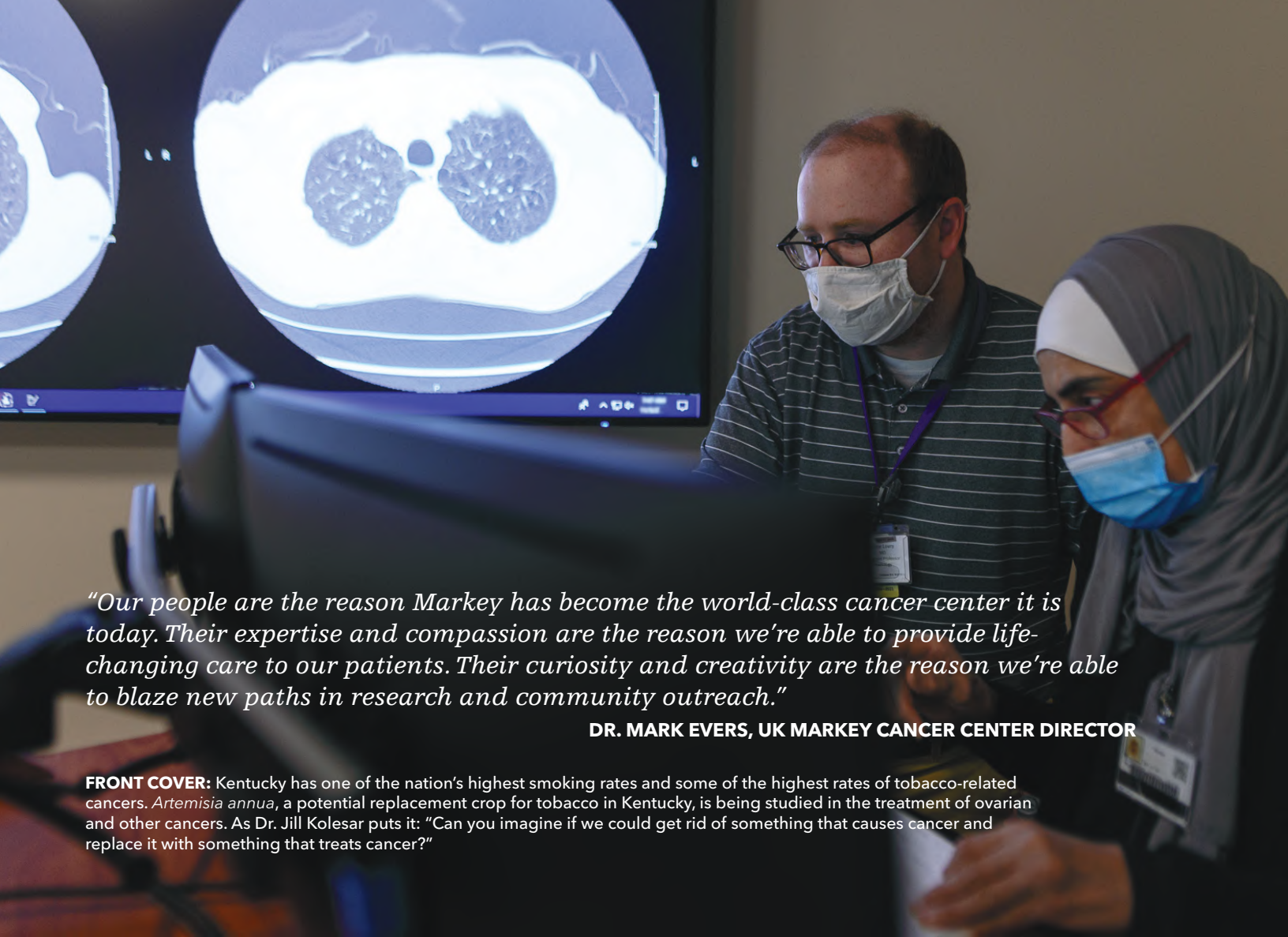


CULTIVATING THE FUTURE OF CANCER CARE



UK experts are leading groundbreaking research into the effectiveness of the plant *Artemisia annua* for treating cancer.

UNIVERSITY OF KENTUCKY
MARKEY CANCER CENTER ANNUAL REPORT 2020



"Our people are the reason Markey has become the world-class cancer center it is today. Their expertise and compassion are the reason we're able to provide life-changing care to our patients. Their curiosity and creativity are the reason we're able to blaze new paths in research and community outreach."

DR. MARK EVERS, UK MARKEY CANCER CENTER DIRECTOR

FRONT COVER: Kentucky has one of the nation's highest smoking rates and some of the highest rates of tobacco-related cancers. *Artemisia annua*, a potential replacement crop for tobacco in Kentucky, is being studied in the treatment of ovarian and other cancers. As Dr. Jill Kolesar puts it: "Can you imagine if we could get rid of something that causes cancer and replace it with something that treats cancer?"

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OUR UNCEASING COMMITMENT

Cancer doesn't listen to stay-at-home orders. It doesn't adhere to social distancing guidelines. It doesn't lay low when our attention is elsewhere or take a break when other crises arise. Cancer doesn't stop. Even amid a worldwide pandemic.

So, when COVID-19 arrived in Kentucky, the UK Markey Cancer Center's mission to confront cancer in the Commonwealth didn't stop either.

Keeping our patients' emotional and physical well-being in mind, Markey's frontline staff and care providers sprang into action to respond to the pandemic, while at the same time remaining laser-focused on providing high-quality patient care.

Our clinics were quickly reimaged to ensure safety during the pandemic. We cared for existing patients and newly diagnosed patients, too, and our expanding array of potentially life-saving clinical trials continued without pause.

Through it all, our team upheld Markey's promise to be the place where Kentucky comes to beat cancer. I could not be more proud of the work they've done and continue to do today.

And while I am tremendously proud, I'm not at all surprised.

You see, our people are the reason Markey has become the world-class cancer center it is today. Their expertise and compassion are the reason we're able to provide life-changing care to patients like Maureen Berry and Debbie Skaggs. Their curiosity and creativity are the reason we're able to blaze new paths in research and community outreach.

And above all else, their unwavering dedication to helping Kentucky beat cancer is the reason why, even through unprecedented challenges, Markey continues to thrive.

Over the next several years, as we strive to become a comprehensive cancer center and as we embark on building the cancer center of the future, I'm confident that 2020 will have only made us stronger. Now we know: No matter what the world throws our way, Markey's people - our patients, our families, our friends at the Markey Cancer Foundation, our care providers and researchers - will be ready.

Because much like cancer, we don't stop, either.

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



THE BEST OF US

The worst of times bring out the best in people.

It might sound like a cliché, but for the UK Markey Cancer Center, it's profoundly true.

When COVID-19 made its way to Kentucky in the spring, it foisted upon all of us challenges we could have never anticipated just months earlier. But, as Dr. Mark Evers says, cancer does not stop for anything. And neither does the Markey community.

At a time when our patients and their families needed comfort and care more than ever, Markey was there. Our providers and researchers put aside fears and anxiety about their own health while bravely continuing their work to provide and pursue world-class cancer treatment.

Simultaneously, the UK Markey Cancer Foundation and its supporters courageously came forward, too. Instead of turning inward in the face of financial uncertainty or personal challenges, our community looked outward. Over and over, we heard one heartening question: How can I help?

As resources and attention across UK HealthCare were rightfully redeployed to address the pandemic, Markey's friends, supporters, and donors stepped up to help the cancer center continue its life-saving work. From donating personal protective equipment to outfit our frontline care providers to providing essential funds to propel existing work in Markey's labs, our community made sure that Markey's momentum never stopped.

Such an inspiring response doesn't happen by chance. It's a response that's built over time, the result of Markey's profound impact in the lives of so many. Whether it's a grateful patient turned generous donor, or a community member who understands the value of having world-class cancer care in the heart of the Bluegrass, our community is filled with people who are proud of Markey and want to help it succeed, no matter what.

Markey pride helped us weather the unbelievable challenges of the COVID-19 pandemic, and it will be an essential ingredient in the future of our cancer center. Whether we're helping Dr. Evers recruit the brightest minds to Lexington, accelerating the creation of a next-generation cancer facility, or supporting Markey's mission to become a comprehensive cancer center, our community will be there.

After all, Markey pride never wavers.



Farra M. Alford
Chair, UK Markey Cancer Foundation



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



A 'SWEET' PROMISE

UK experts develop world's first clinical trial to test plant's effectiveness against ovarian cancer.

Could a plant used to treat malaria hold the key to treating several cancers and be a replacement crop for Kentucky farmers? UK Markey Cancer Center researchers think the answer might be “yes.”

A trial at Markey will test the effectiveness of *Artemisia annua* against ovarian cancer and determine the recommended dose for any future trials.

'Sweet Annie'

Artemisia annua, commonly known as Sweet Wormwood or “Sweet Annie,” is used to treat fever in traditional Chinese medicine. The plant looks like a garden herb and has a sweet and minty scent. In the 1970s, Chinese scientist Tu Youyou extracted a malaria-fighting compound called artemisinin from the plant. The malaria drug artesunate was developed from the compound and is a first-line treatment for the disease. Tu earned a 2015 Nobel Prize in Physiology or Medicine for her discovery.

Ovarian cancer clinical trial

Now, UK researchers believe this plant holds even more promise. DNA damage occurs in all cells, but normal cells, on the other hand, are able to stop growing and repair their damage. Cancer cells don't stop growing and don't repair DNA. They continue to pass on DNA damage to make other cancer cells. In lab tests, *Artemisia annua* appeared to stop cancer cell growth and allow

cells to repair their DNA damage, said Dr. Jill Kolesar, a professor in the UK College of Pharmacy and administrative director of Markey's Precision Medicine Clinic. Those findings led Kolesar and Markey gynecologic oncologist Dr. Frederick Ueland to develop the world's first clinical trial to test *Artemisia annua* in women with ovarian cancer.

The trial will follow women who have completed chemotherapy for ovarian cancer. During this time, doctors usually stop treatment and monitor patients for a return of cancer. Study participants will get various doses of the plant in decaffeinated tea or coffee supplements to determine the correct dose and tolerability. Once researchers find the correct dose, they will move on to a comparative study.

Trials for pediatric AML and COVID-19

Kolesar and UK pediatric hematologist/oncologist Dr. Tom Badgett are also using *Artemisia annua* in a clinical trial for pediatric acute myeloid leukemia (AML). Funded through a state grant, the trial will follow children who are in remission.

Meanwhile, investigators from the College of Medicine also have launched a clinical trial to test the plant's ability to fight COVID-19. A 2005 Chinese study showed *Artemisia annua* had strong antiviral activity against SARS-CoV, the coronavirus responsible for a 2003 SARS outbreak.

Lab studies this year indicated leaves from the plant also have strong antiviral activity against SARS-CoV-2, the virus that causes COVID-19.

The COVID-19 trials will use both the plant extract (with the blended coffees and teas) and the drug artesunate. While lab results are promising, it's too soon to know yet whether or not *Artemisia annua* can help treat people who have COVID-19.

From Germany to Kentucky

The trials are the result of several years of international cross collaboration with UK and other institutions. Researchers at the Max Planck Institute of Colloids and Interfaces in Germany have worked with *Artemisia annua* for years. Their work resulted in a startup company, ArtemiFlow. The coffee and tea used in the Markey clinical trial are made by ArtemiLife™ Inc., an offshoot of ArtemiFlow.

ArtemiLife and ArtemiFlow USA have worked with the UK College of Agriculture, Food and Environment for several years to grow and harvest *Artemisia annua* in Kentucky for research. ArtemiFlow approached the College of Agriculture, Food and Environment's Kentucky Tobacco Research and Development Center (KTRDC) about growing *Artemisia annua*.

The plant's production process is similar to the one used to produce tobacco. In fact, it's so

Opposite: Kentucky Tobacco Research and Development Center research coordinator Patrick Perry and UK students collect an *Artemisia annua* seedling at Spindletop Farm. **Above, left:** Perry and UK students hang the mature plant in a barn, which is similar to how tobacco is dried. **Above, right:** Dr. Jill Kolesar watches as researcher Dr. Rob McCorkle and postdoctoral fellow Dr. David Schweer prepare dilutions of *Artemisia annua* extracts for testing in ovarian cancer cells.

similar that seedlings are transplanted in the fields using the same machine used to farm tobacco. Once *Artemisia annua* leaves are dried, they can be used to create the drug artesunate or they can be blended into coffees and teas. Kentucky farmers now grow *Artemisia annua* for research and production of ArtemiFlow's coffee and tea supplements.

“Can you imagine if we could get rid of something that causes cancer and replace it with something that treats cancer?”

DR. JILL KOLESAR

A tobacco alternative

Kentucky is the only state growing the plant in large quantities. UK College of Agriculture, Food and Environment researchers have worked with farmers to refine the production method. Patrick Perry, a research coordinator for KTRDC, says the state could ramp up production if demand for *Artemisia annua* increases.

Kentucky has one of the nation's highest smoking rates and some of the highest rates of tobacco-related cancers. *Artemisia annua* could change that.

As Kolesar puts it: “Can you imagine if we could get rid of something that causes cancer and replace it with something that treats cancer?”

ADVANCING CANCER CARE THROUGH GLOBAL COOPERATION

Markey forges promising partnership with researchers in India.

Bandra-Worli Sea Link, Mumbai;
Below, Tata Memorial Hospital in Mumbai

The UK Markey Cancer Center continues to expand its national and international research partnerships, with more than 40 percent of its publications involving collaborations with investigators around the world. One group of researchers in particular is concentrating its global outreach efforts in India, collaborating across oceans to benefit American and Indian cancer patients.

Markey researchers have partnered with researchers at premier Indian institutions such as Tata Memorial Hospital in Mumbai and Manipal Academy of Higher Education in Manipal on a series of important oncology initiatives. The collaboration is spearheaded by Dr. Vivek M. Rangnekar, associate director for strategic relations at Markey and co-leader of the Cancer Cell Biology and Signaling Research Program.

“Through our research partnership, we are enabling the development of cutting-edge research concepts and techniques, for a better understanding of cancer in India,” said Rangnekar,

who has been involved in international research collaboration with Indian cancer institutions since the late 1990s. “This partnership with India is consistent with our global outreach and engagement objectives at Markey and will promote cancer research to ultimately enhance patient treatment and care at the participating institutions.”

Rangnekar and his team organized and participated in a breast cancer symposium, held at Manipal and Tata, which focused on basic cancer research, cancer epidemiology, precision medicine, and cancer education and training. The respective institutions are also collaborating on research projects. Those include a joint Markey-Manipal study of the use of liquid biopsies as a diagnostic tool, as well as a molecular epidemiology project between Markey and Tata examining gene signatures in lung cancer survivors.

As a result of their collaborations, the teams have managed to secure research funding, including a precision medicine-focused research training grant

funded by CRDF Global and the National Cancer Institute (NCI) to be used as part of these global outreach efforts with Tata and Manipal.

“This partnership with India is consistent with our global outreach and engagement objectives at Markey and will promote cancer research to ultimately enhance patient treatment and care at the participating institutions.”

DR. VIVEK M. RANGNEKAR

“Precision medicine really hasn’t been implemented at all in India,” said grant recipient Dr. Jill Kolesar, a professor in the UK College of Pharmacy and administrative director of Markey’s Precision Medicine clinic, “so we’re hoping we can use this funding to help [Tata and Manipal] set up their precision medicine programs. And going forward, they’ll be really important research collaborators for Markey.”

Although the worldwide COVID-19 pandemic forced the rescheduling of the Indian researchers’ planned spring 2020 trip to UK, the teams have continued creating plans for future research. In partnership with the Mayo Clinic, they’ve even applied for a D43 NCI Global Cancer Research and Training grant along with Tata, Manipal, and Saroj Gupta Cancer Centre & Research Institute in Kolkata, India.

“We have scheduled a virtual retreat for participating oncology faculty at Markey, Mayo Clinic and the three institutions in India later this year to plan our next steps,” Rangnekar said. “Moving forward, we hope to strengthen our partnership in cancer research and training and expand collaborations with the faculty in this consortium.”



TOWARD TOMORROW'S TREATMENTS

Early-career researchers lead 3 NCI-funded clinical trials at the national level.

With the support of a nationally funded grant focused on drug development, two early-career researchers at the UK Markey Cancer Center are spearheading novel clinical trials. Their aim is to make next-generation radiopharmaceutical cancer therapies accessible to patients across Kentucky and the world. And they're doing it in collaboration with several other high-profile cancer centers across America.

Through Markey's National Cancer Institute UMI grant – a highly competitive, nationwide five-year grant awarded to only 11 principal investigators (PIs) and institutions – three clinical trials led by Dr. Zin W. Myint and Dr. Aman Chauhan, both assistant professors of medicine at Markey, were selected to be funded by the National Cancer Institute's Experimental Therapeutics Clinical Trials Network (ETCTN). The ETCTN employs a collaborative, team-based approach to early-phase clinical trials of NCI Investigational New Drug agents in high-priority areas of unmet cancer treatment needs.

"ETCTN trials are about finding the right drug for the right person based on their cancer's particular molecular makeup using biomarkers," said

Dr. Susanne M. Arnold, associate director of clinical translation at Markey and institutional PI of the UMI grant, in partnership with The Ohio State University. "This really is the cutting-edge theme of oncology research today."

Comprising 40 high-profile cancer centers across the United States, the network funds trials led by clinician scientists at participating sites, and the trials are then conducted by the network sites. This team science approach promotes collaboration among institutions and investigators and significantly broadens the field for data collection and research.

All three of the novel ETCTN trials led by Myint and Chauhan focus on the use of targeted radiopharmaceuticals, "an area that is emerging as a key part of cancer treatment overall," Arnold said.

"Having these novel, cutting-edge trials conducted at UK as well as at other sites across the United States allows patients in Kentucky, who may not be able to travel far, to have access to novel cancer treatments and national research close to home," Arnold said. "These studies really put Markey on the map."

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DR. SUSANNE M. ARNOLD

Neuroendocrine tumors

Chauhan is leading two of the ETCTN trials — both focused on treating neuroendocrine tumors (NETs) with radiopharmaceutical combination therapy.

"Neuroendocrine cancer does not have a whole lot of therapeutic options, as it is somewhat of a rare cancer," Chauhan said. "However, we've seen a six-fold increase in the incidence of neuroendocrine cancer in the last four decades. But the treatment options have not moved at the same pace."

ETCTN 10388 is a phase I trial investigating the side effects and best dose of triapine – a

Markey medical oncology physicians-researchers Drs. Aman Chauhan and Zin Myint have collaborated with Dr. Susanne Arnold, a professional mentor, since early in their training as physician-scientists.

ribonucleotide reductase inhibitor – plus the radiopharmaceutical lutetium Lu 177 dotatate (lutathera) for the treatment of neuroendocrine tumors. Chauhan hypothesizes that these two agents will work together by stopping the growth of tumor cells while carrying radiation directly to tumor cells without harming normal cells.

Similarly, the ETCTN 10450 phase I trial will examine the combination of Lutathera and the novel DNA-PK inhibitor peposertib for the treatment of neuroendocrine tumors. Targeted radiopharmaceuticals treat cancers by causing DNA damage in tumor cells; however, tumor cells often bounce back by repairing their DNA. Chauhan and his research team are analyzing whether peposertib will improve the efficacy of targeted radiation-based therapy by preventing DNA repair, leading to an overall improvement in treatment outcomes for patients.

Prostate cancer

Led by Myint, the third ETCTN trial (10437) is investigating the use of Sn-117m-DTPA for the treatment of castration-resistant prostate cancer with bone metastases. This novel radiopharmaceutical not only targets cancer in the bone but also minimizes radiation toxicity to patients' bone marrow – an important consideration for prostate cancer patients who may already have suppressed bone marrow due to previous chemotherapy and/or hormone therapies.

"When prostate cancer metastasizes, it goes to the bone 80 percent of the time, and bone pain is often the presenting symptom," Myint said. "So this clinical trial is very important for prostate cancer patients."

PERSEVERANCE DURING A PANDEMIC

"We had to rise to the occasion to make sure treatment would continue to be our primary focus. At the same time, we needed to ensure the atmosphere was suitable for care."

DR. MARK EVERS

The COVID-19 pandemic presented hospitals around the world with an unprecedented confluence of conflicting challenges.

How do hospitals care for patients with the virus? How do they keep other patients and frontline staff safe? When is a procedure essential and when can it be delayed?

Those are the questions leaders at the UK Markey Cancer Center faced in March of 2020.

As other hospitals around the country made the difficult decision to delay some cancer treatments and procedures because of the pandemic, Markey weighed its options. To ensure Kentucky hospitals had enough space for COVID-19 patients, as well as those experiencing other emergencies, Gov. Andy Beshear recommended health care facilities pause any non-urgent and elective procedures.

The governor's directive relied on hospitals to decide which treatments were elective. After careful consideration, University of Kentucky and UK HealthCare leadership came to a decision: Cancer treatments are essential, not elective.

Safety during a pandemic

This decision set in motion a host of responses to ensure patients still received vital cancer care in an environment that was safe for them, as well as for faculty and staff. The Markey team worked in tandem with UK HealthCare's infection prevention and control team, following constantly evolving guidelines and information and making adjustments both big and small to help Markey adapt to this new climate.

"We had to rise to the occasion to make sure treatment would continue to be our primary focus," said Dr. Mark Evers, UK Markey Cancer Center director. "At the same time, we needed to ensure the atmosphere was suitable for care."

This meant procuring enough PPE (personal protective equipment) for staff and patients. It also meant visitors were prohibited, physical spaces had to be reconfigured to provide added safety, and physical distancing was implemented wherever practical. "We had to ensure that everyone was safe and that patients received the care they needed," said Dr. Frederick R. Ueland, Markey's director of oncology clinical operations. "The Markey response speaks to the passion and the commitment our team has to one another and our patients."

Patients were screened for COVID-19 symptoms over the phone before their in-person appointments. These calls provided an opportunity for Markey staff to reassure patients of their safety and describe the latest precautions put in place to ensure a safe care environment. "These pre-screening questions have since become a standard practice around the country, but we lived it in real time," Ueland said.

Welcoming patients old and new

Once patients arrived at Markey, they were welcomed by familiar, albeit masked, faces, who performed additional on-site symptom screenings. This helped patients feel more at ease in the new hospital environment.

Visitor restrictions were put in place across care settings, including the chemotherapy and infusion clinic. To help patients feel less alone and more connected with others during their chemotherapy treatment, Markey staff provided video conferencing access and other communication options.

And while the Markey care team nurtured relationships with existing patients, new patients also arrived. Patients from around the region in need of cancer surgery came to Markey when other hospitals delayed their procedures. Markey typically accounts for about 15 percent of all surgeries at UK HealthCare. In April 2020, Markey was responsible for 25 percent of surgical procedures. "We persisted with providing surgeries for patients when other areas could not," Evers said.

Clinical trials continue - and grow

Clinical research is an integral part of Markey's mission, and that mission did not stop in the face of COVID-19.

Across the country, as COVID-19 cases surged, many academic medical centers had to pause cancer clinical trials. UK leadership made the decision to continue as much of Markey's research as possible. "Research is woven into our clinical care model," said Dr. Susanne M. Arnold, associate director of clinical translation at Markey. "University leadership allowed us to continue life-

prolonging research studies and our team found a way to get it done. I am so proud of them."

Faculty and staff working on clinical trials adjusted to day-to-day upheaval wrought by COVID-19. Some researchers worked offsite and others rotated between working onsite and working at home, all the while keeping trials going. "It's a testament to the team," Evers said. "Our providers were committed to those patients."

Not only did Markey continue offering trials specifically focused on treatment interventions, the number of patients who completed or were in the process of completing treatment trials actually increased. That number was 123 from March–August in 2019 and grew to 150 in the same period in 2020. "It really shows the commitment of our faculty and practicing oncologists who were talking to people about trials, and of the staff who were working so hard despite not being in their typical work environments," Arnold said.

COVID-19 trial

Markey's well-established clinical trials infrastructure also helped the university quickly establish a COVID-19 clinical trial. [See sidebar on page 12.]

The trial is testing a number of treatments in patients with COVID-19 who are at a higher risk of severe illness. Markey researchers used their

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expertise to shepherd the trial through regulatory hurdles and swiftly get it up and running.

Helping community hospitals

In addition to patient care and research pursuits, Markey continued to support its 20 Affiliate Network hospitals, which provide care options in local communities across Kentucky and connect patients to specialized treatment at Markey when needed.

Traditional in-person services to affiliates had to be put on hold, and Markey moved its affiliate retreats and annual affiliate network conference to virtual formats.

Despite not being able to connect in person, affiliate members connected virtually via a series of webinars on a wide range of topics. The webinars provided vital, reliable information on subjects including health disparities among racial and ethnic groups, methods and regulation for telehealth, and pharmacy-related strategies to help cancer patients cope and reduce their risk for COVID-19. These webinars were also opened to providers outside the Affiliate Network.

A commitment to patients

By mid-year, most elective procedures had resumed at UK HealthCare. And the Markey team continued to adjust throughout the year to carry out its mission to provide the best care for the people of Kentucky.

“All of us at Markey are lucky to work with such a tremendous group of professionals,” Evers said. “Everyone is very flexible and adapted to a situation that no one could have predicted. We’ve had some successes come out of this experience, and I’m so proud of that.”

MARKEY SUPPORTS COVID-19 RESEARCH EFFORTS

Potential COVID-19 treatments are the focus of an ongoing clinical trial launched at UK HealthCare in March 2020.

“While treatment for COVID-19 continues to evolve, this trial gives us the ability to test multiple therapies and to identify the most promising agents to advance to definitive phase III trials.”

DR. SUSANNE M. ARNOLD

High-risk patients who test positive for COVID-19 but don’t have symptoms that require ICU care are eligible. Researchers are looking at the effectiveness of several therapies, including:

- Artesunate
- Camostat mesilate
- Ivermectin
- *Artemisia annua*

The trial uses a rapid assessment method. This means researchers can quickly include and test new therapies as they find ones that aren’t effective.

“While treatment for COVID-19 continues to evolve, this trial gives us the ability to test multiple therapies rapidly and identify the most promising agents to advance to definitive phase III trials,” said study co-leader Dr. Susanne Arnold, a medical oncologist and associate director of clinical translation at Markey.

Clinical leaders from Markey and the College of Medicine and College of Pharmacy are leading the trial effort.



Dr. Frederick R. Ueland, professor and director of gynecologic oncology

VISION FOR A BRIGHT FUTURE AT MARKEY

Having joined Markey as a gynecologic oncologist in 1998, Dr. Frederick R. Ueland has a deep loyalty to the UK Markey Cancer Center, which he has watched grow. He is now the director of oncology clinical operations.

A specialist in ovarian cancer diagnosis and treatment, Ueland leads a highly experienced team of surgeons he oversees as professor and director of gynecologic oncology. Ueland uses his years of experience at Markey every day to help patients, both in his clinical practice and his role overseeing Markey’s clinical operations.

We caught up with Ueland to talk about his first year in his new role, expansion of cancer facilities, and his vision for the future of Markey.

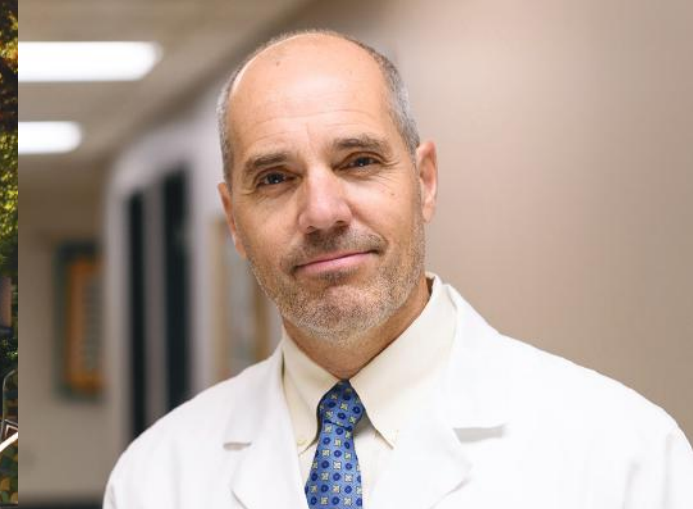
Tell us about your first year as director of oncology clinical operations.

It’s been a genuine privilege to work with our clinical leadership team, Dr. Mark Evers, Dr. Patty Hughes, Nina Barnes and Mark Filburn and all the providers here at Markey because of everyone’s collective devotion to patient care. There is a

pervasive culture of excellence that makes me proud to be part of the Markey mission. When you have that mindset, it makes an administrator’s role more rewarding and enjoyable. I came to the University of Kentucky for training 30 years ago, so I understand our history and the Markey journey. That perspective gives me a deeper understanding and loyalty to this cancer center.

This year, in particular, has been an exciting one – uniquely challenging, but also gratifying. Our administrative team has worked hard to make adjustments to keep our patients, faculty and staff safe during the pandemic. These changes allowed us to continue caring for our patients when most hospital clinics slowed dramatically due to COVID-19. I am very proud of our faculty and staff for their commitment to our patients during this time.

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How has Markey expanded its facilities, and what are the plans for the future?

UK HealthCare recently invested \$15 million to improve the clinical space at Markey. We are two-thirds of the way through with the clinical facility expansion, which touches almost everyone in the cancer center.

We converted our inpatient ward on the second floor of the Ben F. Roach Building to an outpatient Head, Neck and Respiratory clinic, which has helped us grow the lung and thoracic cancer programs over this past year. We've also renovated and expanded outpatient chemotherapy and infusion, increasing our total number of infusion chairs to 40. This increase will significantly improve access to our clinical and research infusions. We also remodeled the third floor for a specialty inpatient Women's Care Unit. We are now embarking on renovations for the Hematology and Bone Marrow Transplantation clinics on the first floor of the Roach Building.

Our cancer center patient visits are growing 10-15 percent each year, so based on projections, these facility expansions will likely reach capacity again by 2023. We are working closely with UK HealthCare administrators to design and build a freestanding, comprehensive ambulatory cancer center. We are also working on future initiatives with the Markey Cancer Center at Lexington Clinic.

You mention Markey's new collaboration with Markey Cancer Center at Lexington Clinic. How has this collaboration helped improve the patient experience?

It has been a meaningful collaboration. Markey Cancer Center at Lexington Clinic has talented specialists. The Lexington Clinic has been a

highly regarded group practice long before the partnership, and we can both learn from the other.

Historically, Markey has had much success in focusing on complex cancers, recurrent cancers and less common malignancies. At the same time, providers at the Markey Cancer Center at Lexington Clinic provide quality care and ease of access for many of Kentucky's most common cancers. Our goal is to have a seamless partnership where patients can move through our health care system efficiently and effectively, receiving exceptional cancer care without leaving the state. And after our first year together, I am encouraged that we are heading in the right direction. Now patients can have the best of both worlds.

As chief of Markey's Gynecologic Oncology division, you've overseen a major expansion with the telehealth program. Why is having different outlets to connect with patients important?

Our Markey telehealth experience started several years ago in the gynecologic oncology clinic. This program preceded the pandemic and relied on provider-to-provider connections, so the patient had to go to their local doctor's office for their visit.

The advantage of telehealth is that it allows UK HealthCare to reach patients who may otherwise have difficulty traveling to Lexington. Many patients prefer an in-person visit, but telehealth is a welcome opportunity for those who may not want to travel several hours in the snow for a 15-minute doctor visit.

When the COVID-19 pandemic unfolded this year, national telehealth regulations were relaxed, which permitted a direct patient-to-provider experience. This modification allowed our patients to complete

the encounter using their home computer, tablet or smartphone. They no longer had to travel to their local doctor's office. While not as comprehensive as an in-person visit, telehealth does provide a very convenient and useful service for our patients, particularly during the height of the pandemic. We continue to look for ways to improve the virtual experience.

COVID-19 is something everyone has had to deal with in various ways. How has Markey continued to offer the high standard of patient care and clinical trials despite it?

March was a trying time because there was very little information available about the disease. We spent long nights creating policies to ensure our patients and Markey personnel remained safe. That led to several changes that remain in place today, including patient screening, limited visitation, universal viral precautions, social distancing and targeted viral testing. I'm very appreciative of Mark Filburn and our entire clinical affairs team for working so hard to establish and implement these changes. Six months later, we know a great deal more, and I am proud to say we got most of it right.

Markey was ranked by U.S. News & World Report as a Top 50 Cancer Center once again this year. What does this continuing recognition tell you about Markey's work?

We are privileged to have this national recognition once again. It's an important yardstick and a telling reflection of our devoted Markey doctors and staff.

Like everyone, we look forward to the rankings each year. We are proud to be ranked in the top 30, but we aren't satisfied. That said, our focus remains on the quality and effectiveness of our

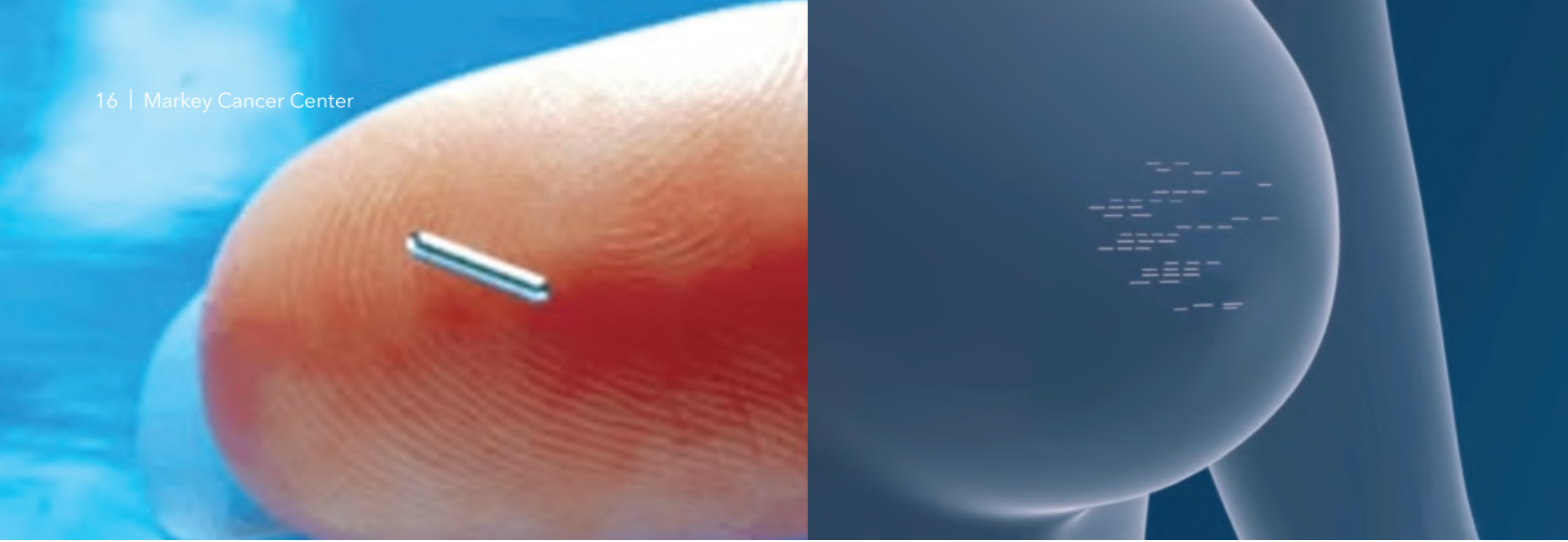
care, patient safety and clinical outcomes. The expectation is that if we do well by our patients, the accolades will follow. We continue to look for ways to improve, which may help explain our ascent in the rankings.

There's been so much growth over the last year in both physical spaces and approach to treatment. Looking forward, what direction is clinical care going at Markey?

Over the past five years, the number of ambulatory visits to the cancer center has doubled. That success means we are reaching more Kentuckians, but it also helps fund programmatic growth. We continue to focus on Kentucky's most common cancers, expanding our lung, breast and gastrointestinal programs. We are also excited about the evolution of two other programs, cancer genomics and radiopharmaceutical therapy.

In some ways, we are a victim of our success. At this pace, we will outgrow our renovated space in the next few years, so we are actively planning a new, comprehensive ambulatory cancer building. This building will integrate all clinical cancer services, including patient care, lab, infusion and pharmacy. It will also include novel programs like outpatient bone marrow transplantation, state-of-the-art targeted infusion therapy, and comprehensive clinical research.

Our five-year collective vision for the cancer center is to mature the Lexington Clinic collaboration, focus on our application to become an NCI-designated comprehensive cancer center, and design and build a new, comprehensive cancer facility. This will keep us busy, but there is greatness on the horizon.



MARKEY FIRST IN KENTUCKY TO OFFER MICROSEED TREATMENT

Leading-edge, one-time breast cancer radiation treatment offered exclusively at Markey decreases clinic visits, increases quality of life.

This year, UK Markey Cancer Center added another next-generation breast cancer treatment offering to its armamentarium, providing patients the flexibility of significantly reduced clinic visits, which, since the beginning of the global COVID-19 pandemic, have become even more important factors in cancer treatment planning.

The UK Department of Radiation Medicine is the first and only medical team in Kentucky to offer Concure Oncology Microseed radiation therapy for patients with early-stage breast cancer. Already widely used to successfully treat prostate cancer, these tiny, implantable seeds deliver a consistent dose of radiation across a two- to three-month period directly to the affected area.

This new and improved therapy option has been proven as effective as traditional whole-breast radiation in properly selected patients. This is especially important for cancer sites like the breast, where the treatment area is near vital organs, including the heart and lungs.

Microseed radiation also requires significantly fewer visits to the clinic for patients, compared with traditional breast cancer radiation therapy, which consists of daily in-person treatments over the course of three to six weeks.

“While our society is slowly reopening, we know that many of our patients would prefer to stay at home as much as possible, and breast Microseed treatment allows for that.”

DR. MARK BERNARD

“After undergoing lumpectomy, a patient visits the clinic for a planning CT scan, where we map out the specific area of the breast for Microseed radiation treatment, and then they come back a second time for the actual seed implantation,” explained Dr. Mark Bernard, assistant professor of Radiation Medicine at UK.

Bernard and Dr. Marcus Randall, professor and chair of the UK Department of Radiation Medicine

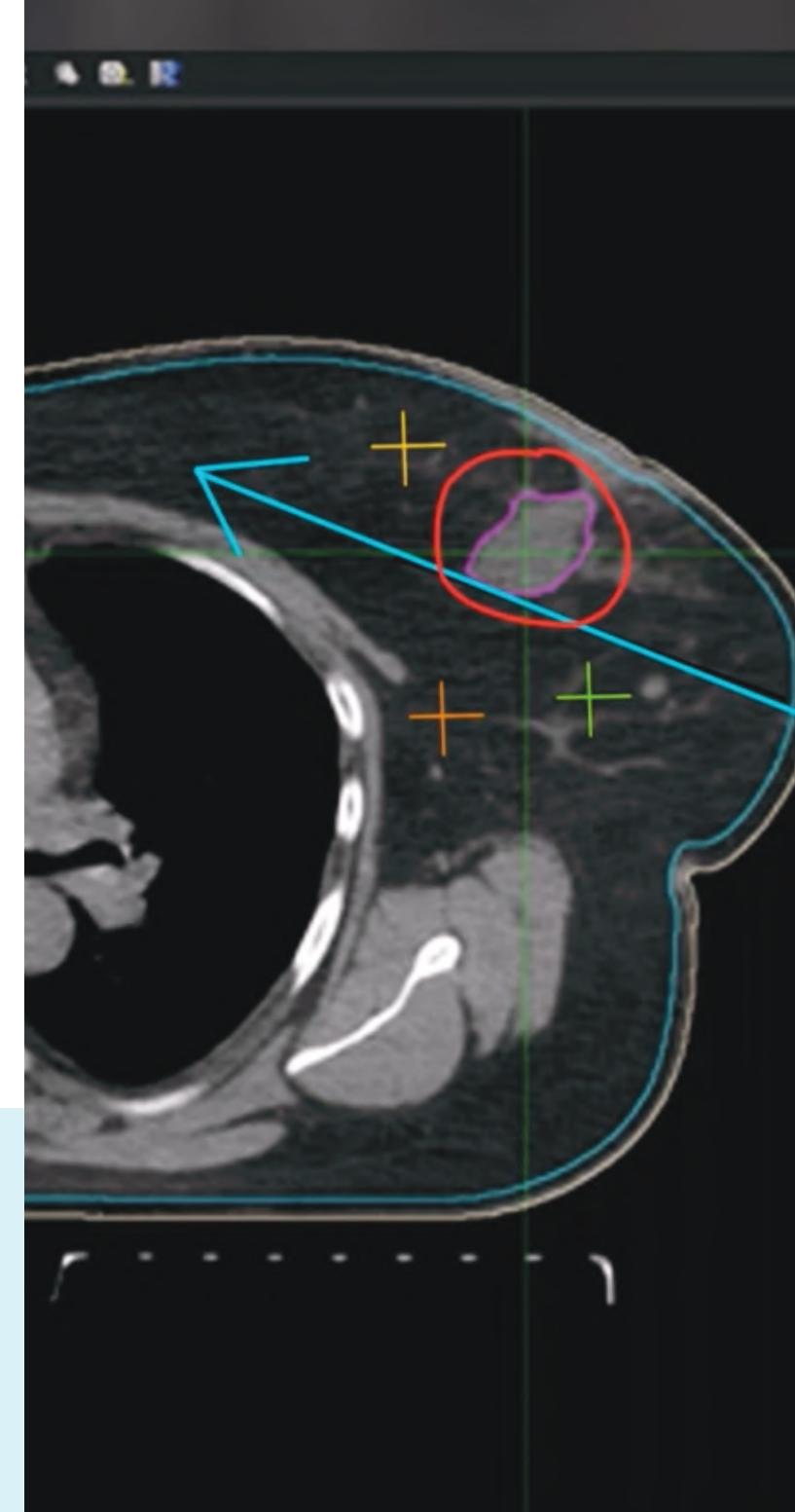
Opposite: Concure Oncology Microseeds are tiny, implantable seeds that deliver radiation directly to the breast tissue in need of treatment, reducing the risk of radiation to the heart and lungs.

Above: Radiation oncologists Dr. Marc Randall and Dr. Mark Bernard are the first two physicians at Markey and in Kentucky to be trained in Breast Microseed Treatment.

Right: A CT scan is done prior to the procedure to identify the tumor bed and aid in planning how the Microseed procedure will be performed.

are the state’s only radiation oncologists trained in breast Microseed treatment. They say patients appreciate having to come to the clinic only twice for the procedure. Not only does the treatment save patients time and travel costs, it also limits the need for in-person clinical visits, which is critically important during the COVID-19 pandemic. “While our society is slowly reopening, we know that many of our patients would prefer to stay at home as much as possible, and breast Microseed treatment allows for that,” Bernard said.

To make an appointment or learn more about this treatment offering, please call UK’s Radiation Oncology Clinic at **859-257-7614** or email Dr. Mark Bernard at **mark.bernard@uky.edu**.





'SO THANKFUL THAT IT WAS FOUND'

Lung cancer survivor stresses the value of second opinions and screenings.

Lung cancer screening can detect the disease at a very early stage – which can mean a cure for people like Debbie Skaggs.

Skaggs, who was a smoker for many years, was diagnosed with COPD (chronic obstructive pulmonary disease) by her hometown doctor in July 2017. But she didn't believe she had COPD, so she went to Dr. William Cundiff, a pulmonary specialist at Baptist Health Hardin in Elizabethtown. Cundiff recommended a low-dose CT scan of Skaggs' lungs – a way to detect early-stage lung cancer in people around Skaggs' age who also have a history of smoking.

Diagnosis and treatment

Skaggs received her lung cancer diagnosis on Nov. 29, 2017. "[After the scan], Dr. Cundiff brought us in – my sister, my husband, my daughter and my son went in there with me that day," she said. "That's when he informed me I had lung cancer and that he was going to go ahead and direct me to a surgeon."

Dr. Jordan Miller, a thoracic surgeon at the UK Markey Cancer Center, performed the minimally invasive surgery to remove the cancer 12 days later. Baptist Health Hardin is a member of the Markey Cancer Center Affiliate Network, a group of community hospitals that

collaborates with Markey to give patients access to the latest treatments while reducing travel outside of the area. When patients like Skaggs need care that isn't available locally, they can go to Markey for specialized care. Markey doctors work with community doctors to ensure seamless coordination of care.

"I had no symptoms. They said, if my cancer hadn't been found, in four or five years, it could've gotten a hold of me. I could be walking around right now with cancer and not know it. Whether you're a smoker, a past smoker or a present smoker, get the screening done."

DEBBIE SKAGGS

Since Skaggs' cancer was caught early, she didn't need chemotherapy or other treatment after her surgery. She went home after five days and was able to celebrate the holidays with her family.

The importance of lung cancer screening

For people like Skaggs, lung cancer screening greatly improves the likelihood of survival. There are many more treatment options when the cancer is found early, and screening can:

- Decrease the risk of lung cancer death in patients who are high-risk for developing the disease

- Detect cancer before symptoms appear
- Find early-stage cancer in a localized area of the lungs

The UK Lung Cancer Screening Program offers low-dose CT screenings for current and former smokers with certain risk factors for lung cancer:

- Ages 55-80
- Current smoker or quit within last 15 years
- Smoke one pack of cigarettes a day for 30 years or two packs a day for 15 years
- No current lung cancer symptoms

The screening program team works closely with referring physicians to provide follow-up testing and care if it's needed.

Skaggs believes getting a second opinion and a lung cancer screening may have saved her life. "I had no symptoms," she said. "They said, if my cancer hadn't been found, in four or five years, it could've gotten ahold of me. I could be walking around right now with cancer and not know it. I'm just so thankful that it was found. Whether you're a smoker, a past smoker or a present smoker, get the screening done."

From diagnosis to surgery to recovery, Debbie Skaggs was surrounded by her loving family. "Team Debbie" came together to help with everything from running her business to bringing her home in time for the holidays.



MAKING A DIFFERENCE FOR YOUNG CANCER PATIENTS

State-funded grant program propels four innovative research projects at UK.

With cancer ranking as the leading cause of death by disease among children and adolescents in the United States and many of the approved therapies causing long-term toxicities, the UK Markey Cancer Center continues to make pediatric cancer research a priority. And now an important and competitive state-funded grant is fueling this work.

“Pediatric cancer in Kentucky is not dissimilar from pediatric cancer in California or Boston or Texas. The results that we find and the discoveries that are made as a result of the KPCRTF funding will benefit children not only in Kentucky but beyond.”

DR. JOHN D’ORAZIO

The Kentucky Pediatric Cancer Research Trust Fund (KPCRTF) provides \$2.5 million each year to pediatric research efforts at the University of Kentucky and the University of Louisville (U of L). The mission of the fund, established in 2015 by the Kentucky General Assembly and overseen by the Kentucky Cabinet for Health and

Family Services, is to prioritize childhood cancer research and ensure statewide access to new and innovative treatment.

“The perfect storm came together of people who were interested in pediatric cancer and who had the influence to do something about lessening its burden in the Commonwealth,” said Dr. John D’Orazio, chief of pediatric hematology and oncology at UK HealthCare and a member of the KPCRTF board. “These funds support some of the awesome research going on at the Markey Cancer Center and at U of L, bringing together our pediatric oncology clinicians and scientists.”

Through the KPCRTF’s competitive application process, Markey was awarded funds for four pediatric research projects, focused on the most common pediatric cancers: leukemia, brain tumors and sarcomas. Data generated from these projects will have far-reaching effects.

“Pediatric cancer in Kentucky is not dissimilar from pediatric cancer in California or Boston or Texas,” D’Orazio said. “The



results that we find and the discoveries that are made as a result of the KPCRTF funding will benefit children not only in Kentucky but beyond.”

Reducing chemotherapy’s adverse effects

Backed by the KPCRTF funding, Dr. Daret St. Clair and her team are diving deeper into their research on using biomarkers to predict and prevent chemotherapy-induced cognition impairment in children and young adults with acute lymphoblastic leukemia (ALL), the most common childhood cancer.

“The success of today’s ALL chemotherapy is very good, with most children achieving remission,” said St. Clair, professor of toxicology and cancer biology and James Graham Brown Endowed

Above: Acute lymphoblastic leukemia (ALL) cells in the blood of a child presenting with leukemia (blood smear under light microscopy). ALL is the most common childhood cancer.

Chair in Neuroscience at UK. “However, a high percentage of these children experience treatment-related brain injury. So if we can recognize the potential for these adverse effects earlier, we can intervene earlier and spare them from a lifetime of quality-of-life issues.”

Building upon their previous discovery that a major cause of chemotherapy-induced brain injury involves the generation of reactive oxygen species (ROS) as well as that extracellular vesicles (EVs) carry proteins damaged by ROS – St. Clair and team are now investigating whether EVs are, in fact, early biological messengers that anticipate chemotherapy-induced brain injury in children with ALL. The team also aims to determine whether the use of an FDA-approved ROS-inhibiting drug during chemotherapy may prevent these associated adverse effects.

“We are hopeful that through our research, we’ll be able to predict and prevent cancer therapy-associated cognitive impairment in children with ALL, and that we may be able to expand this therapy to other pediatric cancers,” St. Clair said.

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Early detection, early treatment

Although current treatments for pediatric ALL have high remission rates, some patients will still experience disease relapse, and relapses occurring in the central nervous system (CNS) are associated with poor outcomes. With the support of the KPCRTF, Dr. Jessica Blackburn and her team are investigating the use of circulating tumor DNA (ctDNA) from patients' blood to identify ALL relapse in the CNS earlier than current clinical tests.

Using this method to detect relapse and metastasis has shown promise in solid tumors, but it has yet to be applied to ALL or CNS relapse in leukemia. Blackburn and her team are also developing a rapid test that physicians can use to determine the best treatment plan for their patients.

"The idea is that if we can detect the ctDNA released by cancer cells earlier than physicians can actually see the cancer cells in the patient, then the physician could start treatment earlier, which may lead to a better outcome for the patient," said Blackburn, assistant professor of molecular and cellular biochemistry at UK.

KPCRTF's support has already paved the way for her team to expand its funding.

"We were able to submit some of our preliminary data from this study to apply for another grant with the National Institutes of Health to explore even more areas of this science and take our lab in a new and exciting direction," she said.

Studying brain and CNS tumors

With the incidence of pediatric brain and CNS tumors (PBCNST) significantly higher in Kentucky than in the United States as a whole and even higher among the state's children living in Appalachia, a novel study to identify factors contributing to this high incidence is under way.

Made possible by KPCRTF support, the population-specific study is led by Dr. Eric B. Durbin and his team. Durbin, assistant professor of biomedical informatics at UK, is director of Markey's Cancer Research Informatics Shared Resource Facility and director of the Kentucky Cancer Registry (KCR).

"Our study has collected the available pathology tissues for all Kentucky children diagnosed with PCNCST between 2000 and 2017, which is unique and may be the first truly population-based study of its kind in the United States."

DR. ERIC B. DURBIN

Using data and pathology specimens from the KCR, its Virtual Tissue Repository and the NIH Kids First Data Resource Center, the researchers are identifying potential environmental exposures, assessing the cancer mutational landscape underlying PBCNST in Kentucky, and determining how genetic risk factors for PBCNST among Kentucky children compare with other children represented in the Children's Brain Tumor Tissue Consortium. They are also implementing informatics infrastructures for data sharing with national PBCNST consortia.

"Other pediatric brain cancer tissue research relies on samples collected as part of a consortium or at a single institution," Durbin said. "Our study has collected the available pathology tissues for all Kentucky children diagnosed with PCNCST between 2000 and 2017, which is unique and may be the first truly population-based study of its kind in the United States."

Despite the COVID-19 pandemic slowing research efforts across the world, Durbin and his team have been able to make headway on their study and secured a second round of funding from the state. They also have received support as part of a

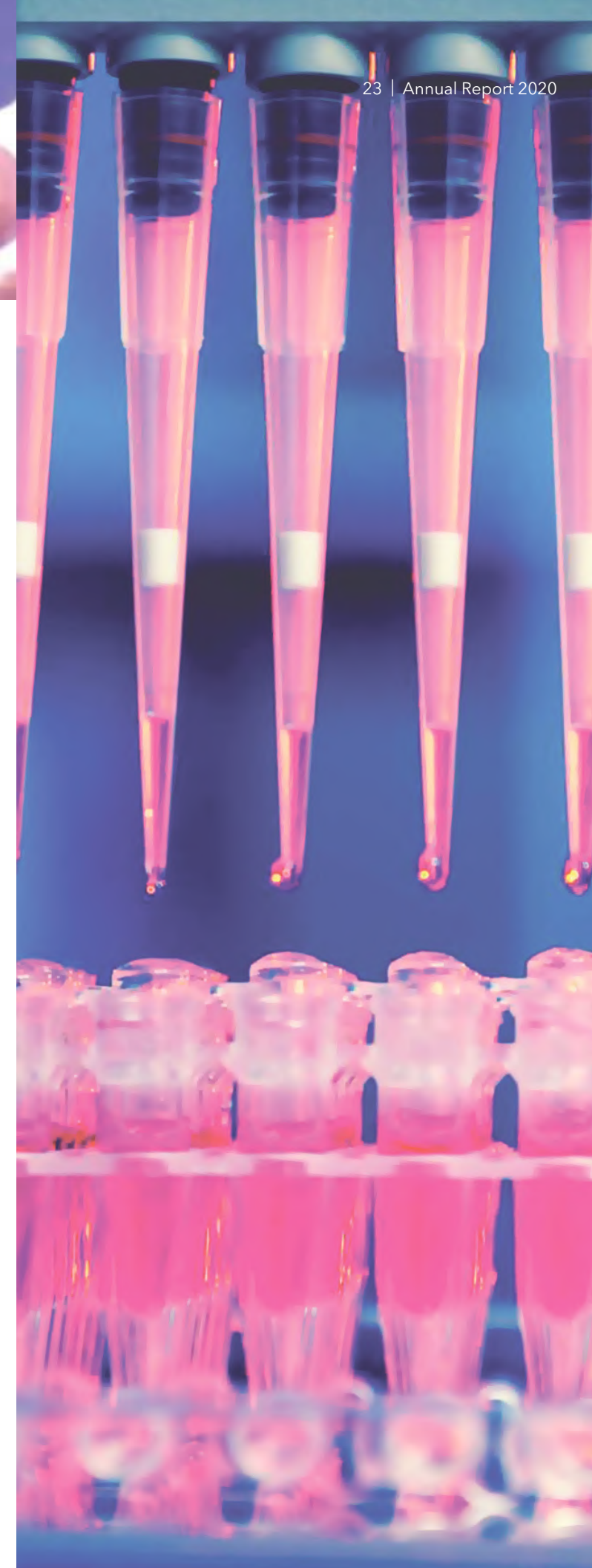
supplement to the Markey Cancer Center P30 grant from the National Cancer Institute to contribute additional data to the National Childhood Cancer Registry.

Targeted therapy for Ewing sarcoma

Ewing sarcoma – a bone and soft tissue cancer most commonly diagnosed in children and young adults – is primarily treated with cytotoxic therapies that can have several adverse effects. There have been no advances in treating this cancer in decades. Building on their previous research in this area, Dr. Markos Leggas and Dr. Jurgen Rohr, both professors in the Department of Pharmaceutical Sciences at UK, are investigating a new drug, which is selectively toxic to Ewing sarcoma tumors, while it spares normal cells.

"Ewing sarcoma is driven by a transcription factor fusion called EWS-FLI1," Leggas said, and when it is eliminated from Ewing sarcoma cells, the cancer dies, making it an ideal therapeutic target." He and Rohr are working to determine the efficacy and safety of an EWS-FLI1–targeted therapy, including "how to use the drug in terms of dosing and frequency of administration, and what happens to the drug once it's inside the body," he said. The team also believes that this preclinical research, funded by both the KPCRTF and the DanceBlue Foundation, will be applicable to the treatment of other cancers in the future.

"There are a variety of different cancers whose malignancy depends on similar transcription factors," Leggas said. "Demonstrating that these novel compounds are efficacious in Ewing sarcoma will provide proof of concept that cancer-driving transcription factors can be targeted with our novel compounds. So, there's a lot at stake with this drug development project."





THE POWER OF COLLABORATION

Middlesboro hospital executive experiences firsthand the strengths of the Markey Cancer Center Affiliate Network.

When Michael Slusher learned he had kidney cancer, he knew he had two excellent options for treatment – one close to home and the other at the UK Markey Cancer Center.

Slusher, community chief executive officer of Middlesboro ARH Hospital, was leaving work in early February 2020 when he began experiencing persistent abdominal pain. He ended up at the hospital's emergency department, where testing revealed the culprit of his severe pain: kidney stones. Even more worrying, scans also showed a 7-centimeter malignant mass in his left kidney.

Up to 60 percent of kidney cancers are found during tests or scans for something else, such as kidney stones, back pain or accidents. "I'm probably the only person who says, 'Thank God for a kidney stone,'" Slusher said, "because it discovered my kidney cancer before it metastasized."

Slusher needed major surgery to remove the tumor. He knew he wanted laparoscopic surgery to reduce his recovery time. His oncologist at Middlesboro ARH, Dr. Mohamed Shanshal, referred him to Dr. Andrew James, a urologic oncologist at Markey. James specializes in open and laparoscopic/robotic-assisted surgery for urologic malignancies.

Because of his job at Middlesboro ARH, Slusher was intimately familiar with Markey and its collaboration with community hospitals, including his own. Through the Markey Cancer Center Affiliate Network, local hospitals throughout the Commonwealth provide high-quality cancer care with support from Markey. Middlesboro ARH joined the Network in 2019.

"When I was offered a choice, I knew where I was going without a moment's hesitation," Slusher said. "As part of the Markey Cancer Center Affiliate Network, I had taken a group of doctors up to Markey for an orientation before I ever had my surgery. I've been to UK several times, and my daughter has had surgery there, so I'm very familiar with UK and knew what to expect going in."

James says laparoscopic surgery is a good option for many people with kidney cancer. "Laparoscopic surgery is a great way to go," he said. "It's not always an option, but it is possible in a lot of situations. Many patients leave after one night, and they have smaller incisions, less pain and less time in the hospital." Slusher was able to go home 24 hours after his procedure and was back at work three weeks later.

Slusher continues to have follow-up care at home with Shanshal, and James remains in close

Opposite, left: Dr. Andrew James is the chief of urologic oncology at the UK Markey Cancer Center and is an expert in robotic surgeries for urologic malignancies.

Opposite, right: Michael Slusher talks with Dr. Mohamed Shanshal, a medical oncologist at Middlesboro ARH Hospital.

Above: Slusher is the community chief executive officer of Middlesboro ARH Hospital.

contact to discuss the care plan. "A lot of these patients with tumors need a multidisciplinary approach involving both a surgeon and medical oncologist," James said. "We have good relationships with oncologists throughout the state who are closer to patients. Being able to continue to see their local medical oncologist for follow-up is often less burdensome."

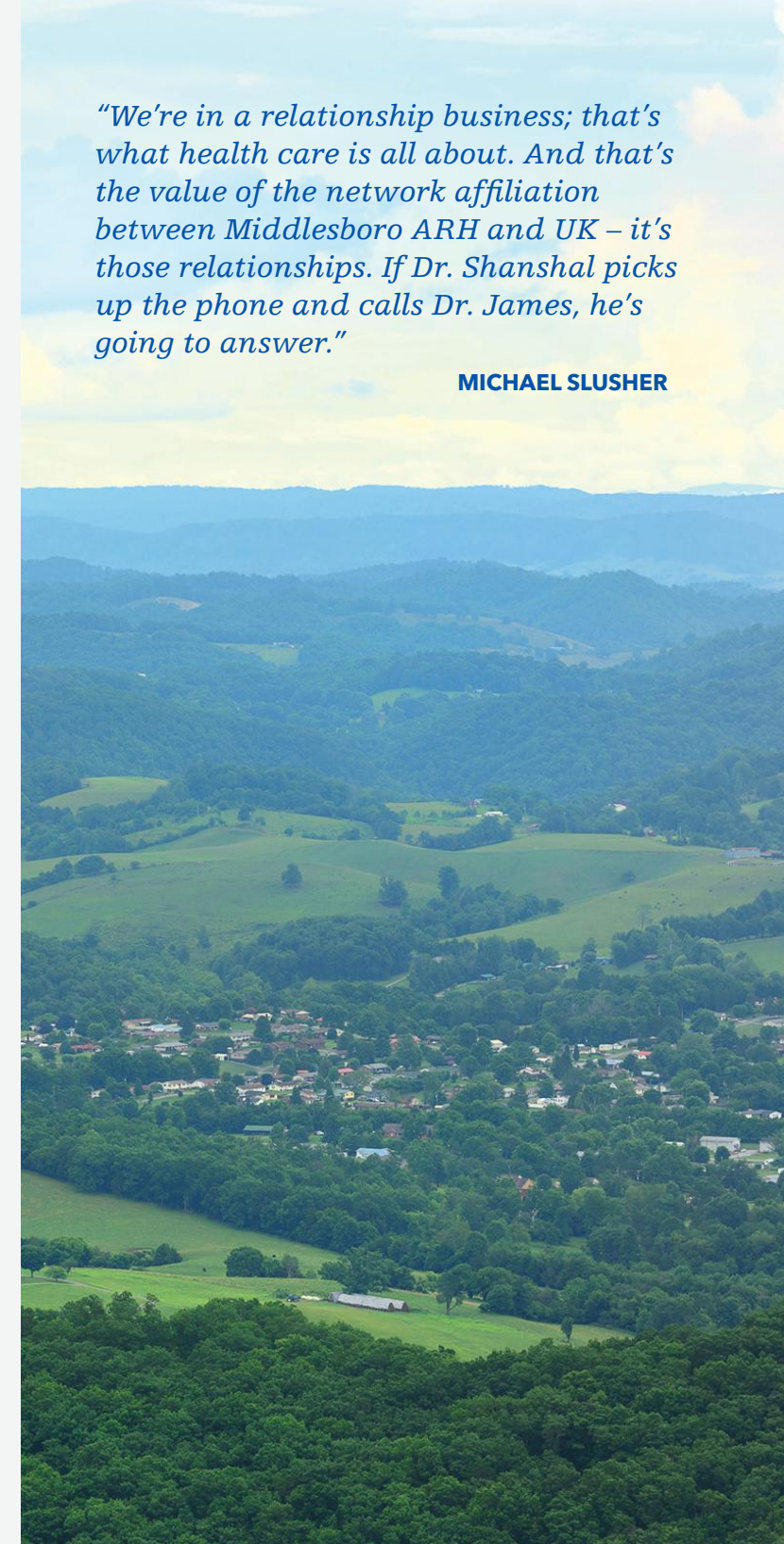
Scans performed at Middlesboro ARH showed all of Slusher's cancer was removed successfully. James reviewed the scans electronically and met with Slusher via a telehealth appointment to discuss the results. "Surveillance is very important after removing these tumors. I remain involved in that process," James said.

It's the way the Markey Cancer Center Affiliate Network was designed to work. Patients get to stay close to home for as much of their treatment as possible and only travel to Lexington for more complex care. Now, Slusher has seen firsthand how these relationships between local providers and Markey can elevate patient care.

"We're in a relationship business; that's what health care is all about," Slusher said. "And that's the value of the network affiliation between Middlesboro ARH and UK – it's those relationships. If Dr. Shanshal picks up the phone and calls Dr. James, he's going to answer."

"We're in a relationship business; that's what health care is all about. And that's the value of the network affiliation between Middlesboro ARH and UK – it's those relationships. If Dr. Shanshal picks up the phone and calls Dr. James, he's going to answer."

MICHAEL SLUSHER





SAVORING LIFE AFTER A LIFE-SAVING SURGERY

Cookbook author's research led her to Markey for treatment of a rare, complex cancer.

Maureen Berry once struggled with disordered eating, but she turned around her relationship with food. Then, when she was in the best shape of her life, she learned she had a rare form of cancer.

The 59-year-old Berry worked for a decade in the restaurant business and spent many years in food sales and marketing. These days, the Western Kentucky resident is a cookbook author, podcaster, speaker and photographer.

"Food changed my life," she said. "Eventually, I conjured my relationship with food into a career that included a new, healthy lifestyle."

Warning signs

Berry began noticing a peculiar feeling of fullness in mid-February 2019. She kept a food journal and realized she was eating no more than 1,000 calories a day. As someone who loves food, she knew something was wrong. Then Berry started feeling a stabbing pain under her breastbone. She went to her local gastroenterologist for an upper GI endoscopy, CT scan and colonoscopy.

The tests showed a basketball-sized mass in Berry's abdomen. The mass was pushing on her abdominal organs and making it difficult for her to eat. Her gastroenterologist suspected a gastrointestinal stromal tumor (GIST).

A definitive diagnosis

Berry did some research and decided to see Dr. Michael Cavnar at the UK Markey Cancer Center. Cavnar diagnosed Berry with a

dedifferentiated liposarcoma. It's a rare cancer that develops in the fat cells of soft tissue and often grows in the abdomen or legs.

Being diagnosed with a cancer that starts in fatty tissue was ironic to Berry. "I was living my best life," she said. "This cancer diagnosis didn't seem fair. And it wasn't. But I also know that life is not about fairness."

Successful treatment

Dedifferentiated liposarcomas can be very aggressive and deadly because they often affect other organs. Berry's tumor had wrapped itself around her internal organs, encasing her left kidney, the left side of her pancreas, her spleen and the left side of her colon. "The question was if we would even be able to remove it," Cavnar said. "We talked about it and in the end, she decided to proceed."

Berry first underwent four rounds of aggressive chemotherapy with medical oncologist Dr. Reema Patel. Unfortunately, chemotherapy didn't shrink the tumor.

"Dr. Cavnar said, 'You only get one shot at this surgery.' I was prepared to do what I had to do, and it saved my life."

MAUREEN BERRY

"At that point, I was exhausted, but I just forged ahead," Berry said. "Dr. Cavnar said, 'You only get one shot at this surgery.' I was prepared to do what I had to do, and it saved my life."



Opposite, left: Maureen Berry meets with medical oncologist Dr. Reema Patel and surgical oncologist Dr. Michael Cavnar at a follow-up appointment. **Opposite, middle:** Holly Chitwood, APRN checks Berry's lungs. **Opposite, right:** Berry hugs Patel at her appointment.

On this page, clockwise from bottom left: Cavnar with Berry; Berry posing inside the University of Kentucky's teaching kitchen; Berry's surgical team, led by Cavnar, inside the operating room.

In August 2019, Berry underwent a 10-hour surgery to remove the entire liposarcoma. It was nearly 20 pounds and 39 centimeters. The surgery team also removed Berry's distal pancreas, spleen, left kidney and left colon.

Surgery for a dedifferentiated liposarcoma takes planning. Cavnar uses imaging to pinpoint potential problems and determine if other specialists need to be in the operating room. The surgery team can include vascular surgeons, urologists and other specialists. In Berry's case, Markey urologist Dr. John R. Bell removed the left kidney.

"This type of surgery takes effort, and it's what you come to a university for," Cavnar said. "We can assemble five different specialists to come together for one operation."

Perseverance

One year after her surgery, Berry's scans are clear and she is cancer free, Cavnar said. Because liposarcomas have a high recurrence rate, Berry may need more operations down the road. "She's doing well," he said. "She had a really big operation. She had some side effects and struggled for a while, but she is very motivated."

The perseverance Berry displayed was unique, Cavnar said. "She had a long hospital stay and she just toughed it out. I think a lot of people wouldn't have handled it the way she did, and that makes a big difference."

AN EVEN STRONGER COMMITMENT TO THE COMMONWEALTH

Markey's population research and community programs focus on reducing Kentucky's cancer burden.

Kentucky has the highest rates of cancer and cancer deaths in the nation, but it doesn't have to be that way. Half of new cancers every year could be prevented by using existing tools better. The UK Markey Cancer Center is focusing on developing programs and services to make a difference for the people of the Commonwealth.

Focused action plan

"We need to focus on areas where we can have a big impact," said Dr. Pamela Hull, who recently joined Markey as the associate director of population science and community impact.

Hull leads Markey's newly formed Community Impact Office, where she oversees the cancer center's community outreach and engagement efforts. She also oversees Markey's population science research through the Cancer Prevention and Control Research Program and other resources. She and her team will build upon ongoing work to develop programs that reduce cancer risk and mortality. This includes increasing access to effective, evidence-based cancer screenings and treatments and promoting research and outreach that responds to community needs.

In Kentucky, that means targeting several key areas identified by communities as priorities:

- Continued colorectal screenings
- Tobacco treatment and cessation
- Cancer survivorship

"It's our responsibility to serve the entire Commonwealth of Kentucky – not only our patients but the whole population," Hull said. "It's a big responsibility, but it's something we take seriously. As the only NCI-designated center in the state, we have a commitment to ensure our efforts address and respond to the needs of Kentuckians."

State and community partnerships

Community engagement at Markey is buoyed by a network of local and statewide public health partners, including:

- Kentucky Cancer Consortium (KCC): Markey is the home of this statewide comprehensive cancer coalition. The consortium's more than 70 member organizations develop the state's cancer action plan.
- Kentucky Cancer Program (KCP): This statewide cancer control program is divided into two areas:

"It's our responsibility to serve the entire Commonwealth of Kentucky – not only our patients but the whole population. As the only NCI-designated center in the state, we have a commitment to ensure our efforts address and respond to the needs of Kentuckians."

DR. PAMELA HULL

The newly established Community Impact Office at Markey is led by Dr. Pamela Hull (center), Dr. Jerod Stapleton (left) and Dr. Krystle Kuhs (right) co-lead Markey's Cancer Prevention and Control Research Program.

KCP-East at Markey and KCP-West at the University of Louisville. The program includes regional cancer control specialists who build and coordinate partnerships and programs through district cancer councils to meet the unique needs of each area.

- Markey outreach programs: Outreach staff provide health education events to promote cancer prevention and early detection. They also organize special cancer screenings for people who do not have health insurance or can't come in during regular business hours.

All these programs are now a part of the Community Impact Office. The office also works closely with the Kentucky Cancer Registry. Markey leads this statewide registry for Kentucky, which records and shares data on every cancer case in the Commonwealth. This allows for the coordination of data and resources. It also facilitates the sharing of community perspectives and priorities.

Making an impact

More attention needs to be paid to creating tools and information that cancer centers can use to engage partners and prioritize programs that make a difference, Hull said.

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Dr. Lovoria Williams, assistant director for cancer health equity

UK Nursing faculty member named assistant director for cancer health equity at Markey

The UK Markey Cancer Center has appointed Dr. Lovoria Williams as assistant director for cancer health equity, a newly created position on the Markey leadership team.

This position within the Markey leadership structure will form part of the Markey Community Impact Office. In this new role, Williams will provide leadership for the health equity aspects of Markey's community outreach and engagement functions, which are critical aspects of a National Cancer Institute-designated cancer center.

Williams is an associate professor in the UK College of Nursing and co-director of Integrated Special Populations for the UK Center for Clinical and Translational Science. As part of her assistant director role at Markey, she will hold an endowed Research Professorship in Cancer Health Equity.

A major initiative of Williams and the Markey Community Impact Office will be the organization and expansion of Markey's research and outreach portfolio that is focused on reducing cancer and other health disparities based on race/ethnicity, socioeconomic status, disability, gender identity, sexual orientation, immigration, veteran status and other factors.

In her new role, Williams will also serve as chair of the UK Markey Cancer Center Diversity, Equity and Inclusion Committee, announced by Markey Director Dr. Mark Evers in July. The committee will provide input directly to Evers on creating and sustaining a diverse, equitable, and inclusive environment that empowers all Markey stakeholders toward the common goal of defeating cancer and achieving health equity.



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When engagement and research respond to community needs, they can make a powerful impact. Previously, Markey collaborated with community partners through the Kentucky Cancer Consortium and the Kentucky Cancer Program to raise awareness about the need for colorectal cancer screening. Because of these efforts, screening rates doubled from about 35 percent in 2001 to nearly 70 percent in 2014, and mortality declined 30 percent. “We were able to help catalyze coordinated efforts to make that happen,” Hull said.

Another priority identified by KCC members and KCP district cancer councils is tobacco treatment. The Community Impact Office will collaborate with these stakeholders using a community-engaged process to select and implement evidence-based tobacco treatments.

Cancer Prevention and Control Research

Jerod Stapleton and Dr. Krystle A. Kuhs are co-leaders of Markey’s Cancer Prevention and Control Research Program. They mentor faculty, facilitate new collaborations, plan grant submissions and make sure researchers are connected to the data and resources they need. Stapleton and other researchers are applying for a grant that would fund a study of Kentuckians between ages 15 and 39 who have been diagnosed with cancer.

In collaboration with Markey’s Dr. Ty Borders, director of the Rural Underserved Health Research Center at UK, researchers want to document follow-up care, mental health outcomes and differences in rural and urban populations so they can better understand the survivorship experience for these adolescents and young adults. This study developed after researchers used Kentucky Cancer Registry data to find that young adults diagnosed with cancer in Kentucky fare worse than their counterparts nationwide. “We want to understand the needs of these survivors to inform the type of clinical care that is needed throughout the state to address them,” Stapleton said.

Building community

Any plan to curtail cancer rates in Kentucky should aim to reduce inequities in access to care and resources, Hull said. The Commonwealth as a whole has higher poverty levels and lower education rates compared with other states. Appalachian Kentucky is among the most economically distressed regions in the country. Efforts also need to focus on African Americans and Hispanics, who experience higher rates of cancer in Kentucky, and the unique needs and screening barriers of the LGBTQ community.

A strong community outreach and engagement program is a crucial part of Markey’s goal to become a comprehensive cancer center as designated by the National Cancer Institute. “We have to show we are having an impact and measuring that impact,” Hull said, “and that we’re listening to and learning from the community.”

For community outreach to be truly successful, trust needs to be built and maintained with the people of Kentucky. Hull wants to make sure research findings are shared. “We don’t want researchers to come to a community, collect data, then leave and the community never hears from them again,” Hull said. “We focus on lasting partnerships to fight cancer together.” Hull plans to hire a health communications expert who can share findings with the public via social media, digital products and other methods. “We want to connect the research back to people so they know what they can do to prevent cancer and find it early in their community,” she said.

Grounded in the past

Hull and her team follow in the footsteps of leaders who grew and guided Markey’s cancer control and prevention program. Dr. Thomas C. Tucker served as the associate director for cancer prevention and control and associate director of the Kentucky Cancer Registry, while Dr. Robin Vanderpool served as the associate director of community outreach and engagement. Debra



“It’s inspiring to contribute to cancer prevention efforts at Markey and see the real commitment and buy-in that our investigators have to the state and the residents and to understanding the concerns and community needs. I think that’s very refreshing, and it starts with the leadership.”

DR. JEROD STAPLETON

Armstrong, who recently retired from UK, was director of the Kentucky Cancer Program. The Markey Cancer Foundation and its board members were also instrumental in recruiting Hull and providing funding for her position and other needs for community outreach and engagement.

Stapleton says prioritizing the health of Kentuckians is a way of life at Markey, in large part because of the work of its director, Dr. Mark Evers. “It’s inspiring to contribute to cancer prevention efforts at Markey and see the real

commitment and buy-in that our investigators have to the state and the residents and to understanding the concerns and community needs,” he said. “I think that’s very refreshing, and it starts with the leadership.”

The new Community Impact Office and new Cancer Prevention and Control Research Program leaders will help further grow the reach and impact of collaborative efforts with partners. “We want to reduce the cancer burden and prevent people from getting cancer,” Hull said. “And if they get cancer, we want to catch it early so they have the best chance of beating it. We have the highest cancer mortality in the whole country. We’ve got a lot of work to do, and the only way we’ll pull those numbers down is if we work together with community partners across the Commonwealth. We can only improve. There’s only one way to go.”

OUTREACH HIGHLIGHTS IN PAST YEAR



LED TO MARKEY AND LED TO GIVE

When Amanda Lockey was diagnosed with metastatic neuroendocrine tumors almost six years ago, all signs pointed her to the UK Markey Cancer Center.

Amanda and her husband, Payton, are lifelong residents of Madison, Mississippi. When Amanda was first diagnosed, she went to Dr. Bobby Lee Graham, an oncologist in her hometown. Graham had treated Amanda's grandmother, grandfather and father-in-law, so she trusted him.

Neuroendocrine tumors are rare and make up only about 10 percent of all pancreatic tumors. Graham recommended Amanda see Dr. Lowell Anthony at Markey. Anthony is nationally known for treating and researching neuroendocrine tumors.

Then Amanda's best friend, who is an oncology pharmaceutical sales representative, talked to an oncologist in Mississippi who recommended Anthony. She also attended a dinner of medical professionals in Chicago, where a nurse said Amanda needed to see Anthony. "Our heads were spinning after the diagnosis," Amanda recalls. "I'm sure there are a lot of great places, but when all that happened, we just felt that God was leading us. How many more signs did we need?"

Amanda received her diagnosis in December 2014 and had her first appointment with Anthony in January 2015. "He took so much time with us and was very upfront about everything," she says. "He was thorough and realistic. He spent an hour and a half with us and it was just amazing. He wasn't talking to me like a patient. He was talking to me like a person. We appreciated his honesty." Before coming to Markey, Amanda also met with Dr. David A. Kooby, a surgical oncologist at Emory

University. Kooby recommended she receive treatment before he performed an operation.

"Dr. Anthony and Dr. Kooby even talk on the phone during my appointments. You just don't find that kind of collaboration everywhere."

AMANDA LOCKEY

Anthony treated Amanda with two oral chemotherapy medications, which shrunk her tumors. Kooby then operated two years ago to remove two-thirds of Amanda's pancreas, as well as her gallbladder, spleen and about 20 lymph nodes.

All three of Amanda's doctors work well together, even though they are in Kentucky, Mississippi and Georgia. "Dr. Anthony and Dr. Kooby even talk on the phone during my appointments," Amanda says. "You just don't find that kind of collaboration everywhere."

In 2020, tumors began growing on Amanda's liver, and Anthony recommended a combination of chemotherapy and surgery. Amanda had one surgery in August and is awaiting another one. Recovery from the first surgery was rough, but she says she's feeling close to normal these days.

Amanda appreciates that Anthony understands how important it is for her to attend her children's soccer games and family vacations and be an active participant in family life.



Above: Lockey family at their Mississippi home.

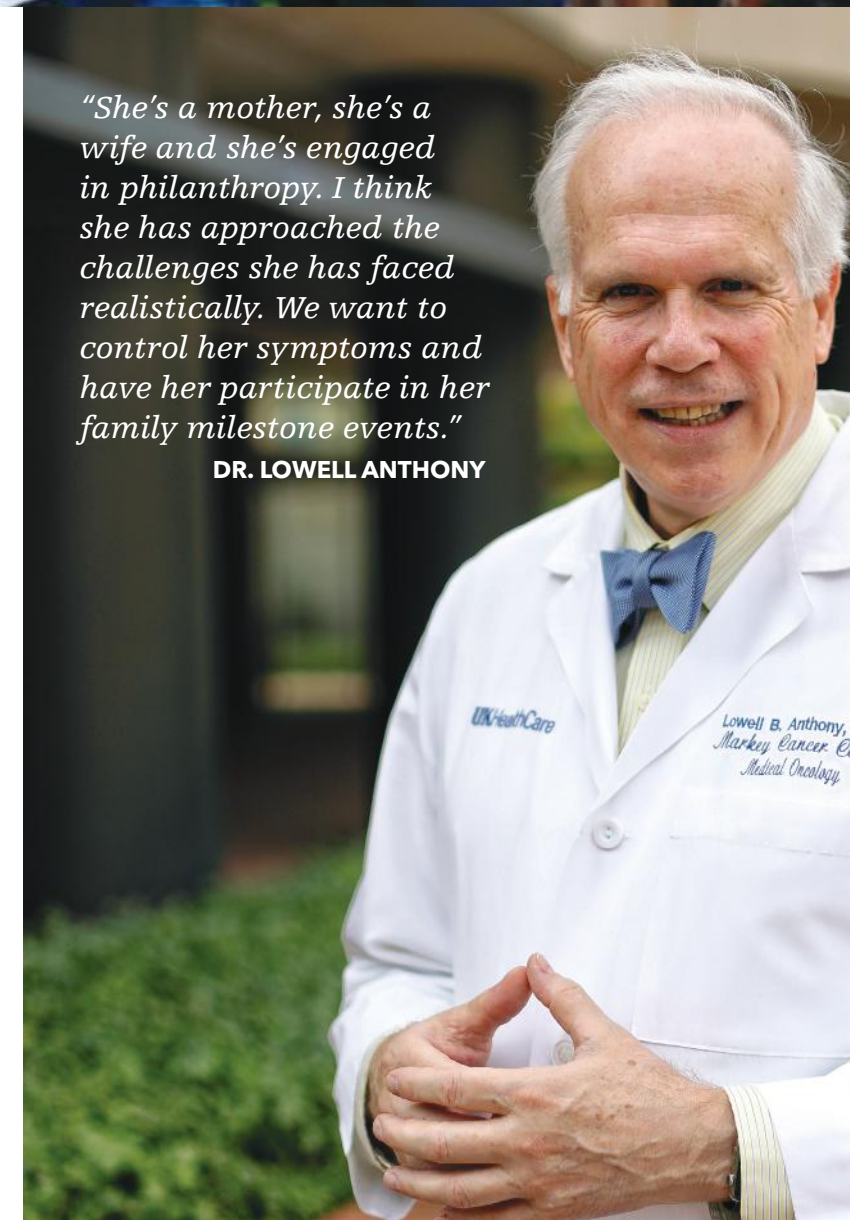
Right: Dr. Lowell Anthony, a national expert in neuroendocrine cancer and division chief of medical oncology at UK Markey Cancer Center.

"When our goals are not to cure, then quality of life becomes the number one goal," Anthony says. "She's a mother, she's a wife and she's engaged in philanthropy. I think she has approached the challenges she has faced realistically. We want to control her symptoms and have her participate in her family milestone events. Our goal is to get her to her daughter's graduation and then we'll create a new goal for what we want to achieve next."

Amanda and Payton have appreciated the care at Markey and wanted to give back to the institution. They chose to fund a clinical trial for neuroendocrine research because it's a rare type of tumor that doesn't get the funding that more common cancers receive. "We want to do what we can for anybody that's diagnosed with it," Amanda says. "The future of cancer is in the research and the cutting edge treatment. I feel like God led us to Markey for so many reasons. It's a way of giving back to Markey because they've done so much for us."

"She's a mother, she's a wife and she's engaged in philanthropy. I think she has approached the challenges she has faced realistically. We want to control her symptoms and have her participate in her family milestone events."

DR. LOWELL ANTHONY



HEALING THROUGH GIVING

Cathy Jacobs knows the impact the UK Markey Cancer Center has on people's lives. She's seen it firsthand as her family and friends received treatment. Her time at Markey has also allowed her to witness the journeys of others from across the Commonwealth.

"I am so happy that we as Kentuckians have this wonderful state-of-the-art hospital right here to help those that have to fight this horrible disease," said Cathy, who has lived in Lexington for her entire life. She and her late husband, Don, both ran successful businesses in the area before retiring shortly after they married. She had an advertising firm and he owned car dealerships. "We felt it was our duty and responsibility to give back to the community we both loved and appreciated," she said.

The couple began supporting UK HealthCare with a generous gift 10 years ago. They also established the Don and Cathy Jacobs Health Education Center at the UK Albert B. Chandler Hospital. Prominently located on the first floor of the hospital, the education center provides patients and families with information about illnesses, treatments, procedures and aftercare.

Don passed away in 2015, one year after a lung cancer diagnosis. Since then, Cathy has continued the couple's tradition of philanthropic donations to the university. The Don Jacobs Sr. Charitable Foundation contributed funding for the university's Don and Cathy Jacobs Science Building. Cathy also made a generous gift for the Kentucky Children's Hospital Health Education Center in honor of her young niece Reagan, who passed away from cancer three years ago. The children's center provides developmentally appropriate health information to pediatric patients and supportive information for their parents.

Cathy, who serves on the board of the UK Markey Cancer Foundation, also contributed a gift for UK HealthCare's Integrative Medicine & Health Clinic, located within the Markey clinical space. The program offers acupuncture, massage, yoga, art therapy and other holistic therapies. "There are a lot of positives to integrative medicine," she

said. "A patient can have acupuncture to help with the pain or a family member can participate in art therapy or yoga therapy. It's a huge help, and if nothing else, it's an hour to give your mind a rest."

Cancer has been an unfortunate presence in Cathy's life, but also one that has inspired her philanthropic gifts. Her father also died of cancer; her best friend had breast cancer; and her mother has fought three bouts with cancer. All of her loved ones have received treatment at Markey. "I love Markey because I've seen it up close and personal," she said.

Because she's spent so much time at Markey, she's all too aware that Kentucky has the nation's highest rates of cancer and cancer deaths. "Cancer sadly is so prevalent, not only in my family but my state," she says. "I'm grateful that I can help. I've been so blessed in life and those blessings come with responsibilities."

Right: Cathy Jacobs.

Below, left: The yoga room at the UK Integrative Medicine & Health Clinic.

Below, right: The Don and Cathy Jacobs Health Education Center at UK HealthCare.



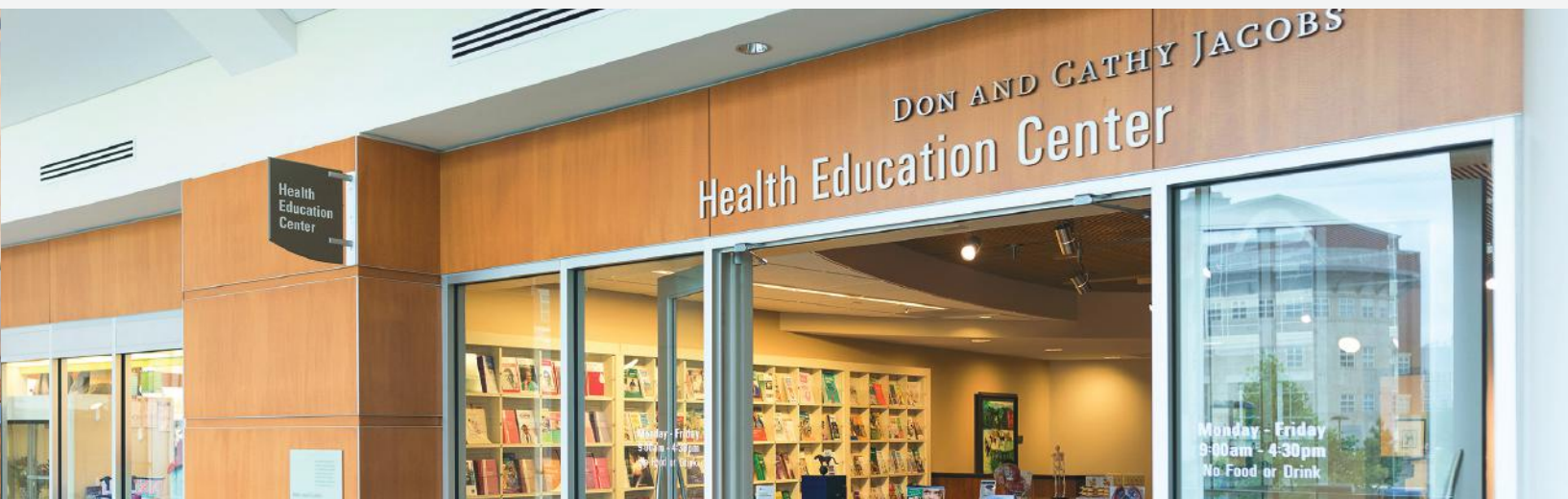
"Cancer has had such an impact on my family and me that if I see or feel that I can do something to make a difference, I'm all in."

CATHY JACOBS

"Cathy took her sadness – which must have been unfathomable – and directed her kindness toward helping others," said Michael Delzotti, CFRE, FAHP, president and CEO of the Markey Cancer Foundation. "Her healing came from giving and caring. It is a powerful statement."

Cathy draws inspiration from a quote by Minor Myers Jr., who served as president of Illinois Wesleyan University: "Go forth and do well. But, more importantly, go forth and do good."

"Cancer has had such an impact on my family and me that if I see or feel that I can do something to make a difference, I'm all in," Cathy said. "I think we all have a responsibility in life to look out for our fellow man. I feel that God has blessed me so that philanthropy just comes naturally to me."



The following is a list of donors who supported the UK Markey Cancer Center by making gifts and pledges between July 1, 2019, and June 30, 2020. We are grateful for their generosity and steadfast support of the Markey mission.

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Markey Women Strong

FY 2019

Markey Women Strong is a generous group of donors who have a unique focus – to fund women-led cancer research at the UK Markey Cancer Center. The membership contribution of \$1,000 supports female researchers working to solve the mysteries of cancer through two grants of \$50,000 each.

- | | |
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Call to Post Society

FY 2019

Members of the Call to Post Society generously contribute \$1,000 or more of unrestricted funds during a calendar year to support the fight against cancer. Based on the amount given, donors are placed in different giving levels, with each tier offering its own set of benefits.

\$2,500 - \$14,999

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NOTE:
FY 2019 = 07/01/2019 - 06/30/2020

Gifts given to Markey through UK HealthCare

FY 2019

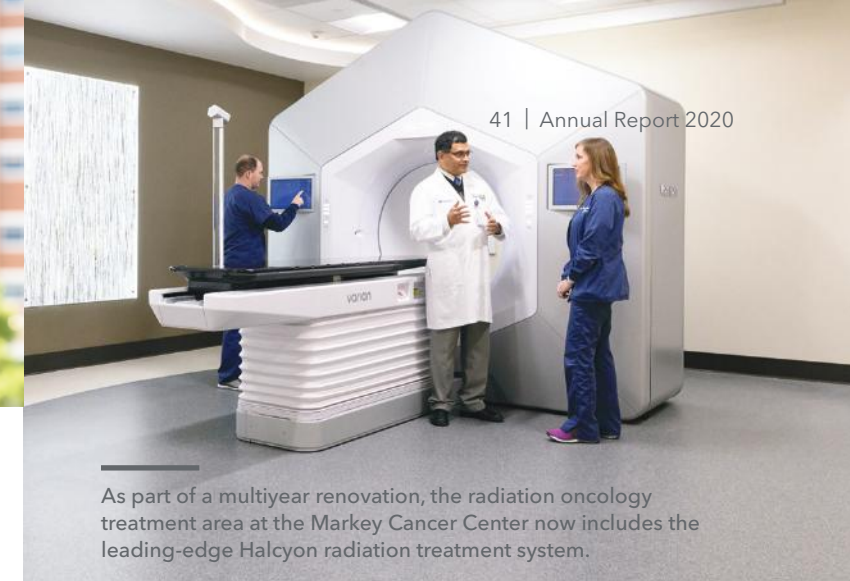
The UK Markey Cancer Foundation is thankful for all gifts made in support of our mission. The following donors provided critical support via gifts made directly to the cancer center.

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MARKEY IN BRIEF

Additional highlights that helped make 2020 a banner year for Markey Cancer Center.



Cancer education in ACTION

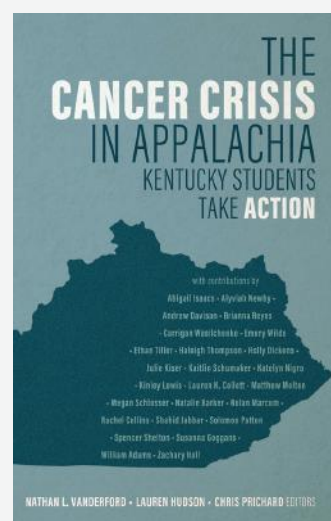
A young woman remembers what it was like when her stepbrother was diagnosed with leukemia. A young man watched his grandfather battle prostate cancer. These and other stories of cancer's profound personal impact are collected in a book of essays written by students participating in the UK Markey Cancer Center's Appalachian Career Training in Oncology (ACTION) Program.

Published in 2020 by the University Press of Kentucky, "The Cancer Crisis in Appalachia: Kentucky Students Take ACTION" features essays by 20 high school and five University of Kentucky undergraduate students.

Kentucky has the country's highest rate of new cancer cases and cancer deaths, and the Appalachian region is the epicenter of the disease's devastation. The ACTION Program gives high school students and college undergraduates from Appalachian Kentucky a chance to make a positive difference in the fight against cancer by combining hands-on experience in cancer research and in clinical settings with opportunities to engage in cancer outreach and education.

The student essays seek to inspire and inform readers through personal stories and provide useful information on cancer prevention methods. Among other aspects, the essays in the book tie Eastern Kentucky's culture of tobacco use to its

cancer epidemic and highlight the potential of enhanced cancer literacy levels among residents of the area.



The book is available at Amazon, Barnes & Noble, Joseph-Beth Booksellers and other bookstores. Proceeds from sales will fund the ACTION Program's outreach and education programs.

Dr. Reshma Ramlal, attending physician in the Hematology and Blood & Marrow Transplant Division of the Markey Cancer Center

Ramlal named 2020 Woman of the Year

Dr. Reshma Ramlal was named the 2020 Lexington Woman of the Year by the Leukemia & Lymphoma Society.

The Man & Woman of the Year campaign is a 10-week fundraising competition for leaders in communities across the country. Candidates are judged on their success raising money for the Leukemia & Lymphoma Society.

Ramlal is an attending physician in the Hematology and Blood & Marrow Transplant Division of the Markey Cancer Center. She specializes in caring for patients with acute leukemia and is an expert in allogeneic bone marrow transplantation. Ramlal and her team raised \$17,100, which goes directly to the organization's blood cancer research and patient services.

"The amount raised during this pandemic and time of economic instability speaks volumes to the generosity of the people in our community and the UK family."

DR. RESHMA RAMLAL

Because of the COVID-19 pandemic, Ramlal used social media to solicit donations and reached out to people directly. "The amount raised during this pandemic and time of economic instability speaks volumes to the generosity of the people in our community and the UK family," she said. The four Lexington-area Man & Woman of the Year candidates raised over \$41,000 in 2020, and candidates throughout Kentucky raised \$350,000. The Leukemia & Lymphoma Society held a virtual gala to honor the work of candidates in Lexington and Louisville. "With it being a virtual event, I was able to have my family from Trinidad there to support me," Ramlal said. "That made it very exciting."

As part of a multiyear renovation, the radiation oncology treatment area at the Markey Cancer Center now includes the leading-edge Halcyon radiation treatment system.

Innovative Halcyon technology transforms treatment experience

UK Radiation Oncology recently installed the leading-edge Halcyon treatment system, making the Markey Cancer Center home to some of the most advanced radiation technology anywhere in Kentucky.

The new Halcyon treatment system delivers precise treatment up to four times faster than standard technology, taking only about two minutes, and minimizing the time a patient is on the table.

The renovation project also included computerized tomography scanning on rails. Also called CT on rails, the technology easily integrates into Markey's new brachytherapy suite. There's also a redesigned and expanded reception area and expanded conference room.

"We can take advantage of capabilities not available anywhere else in Kentucky, all under the experienced and talented direction of a phenomenal team of doctors, therapists, dosimetrists, nurses and others."

DR. MARC RANDALL

The new technologies allow the Markey Cancer Center team to offer the most sophisticated treatments available, said Dr. Marc Randall, radiation oncologist and chair of Radiation Oncology. "We can take advantage of capabilities not available anywhere else in Kentucky, all under the experienced and talented direction of a phenomenal team of doctors, therapists, dosimetrists, nurses and others."



Dr. Teresa Fan, left, and Dr. Kate Zaytseva

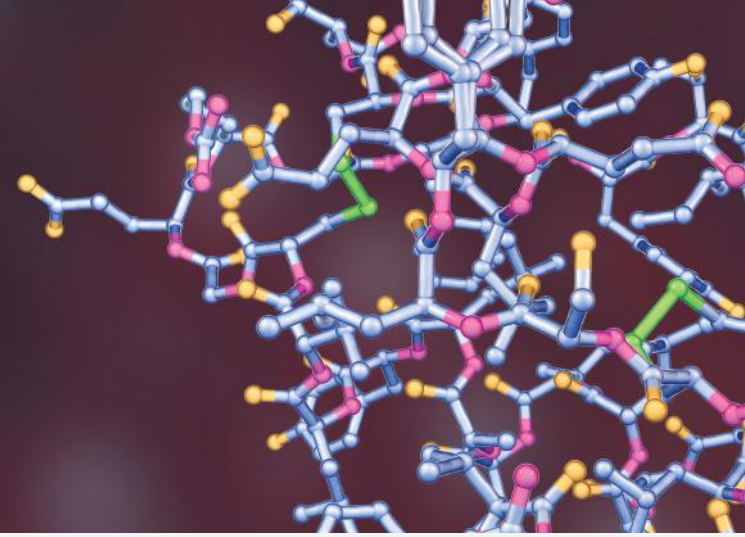
Markey Women Strong Grant Recipients: Teresa Fan and Kate Zaytseva

Two researchers from the UK College of Medicine Department of Toxicology and Cancer Biology received the 2020 Markey Women Strong Distinguished Researcher Grant.

Dr. Teresa Fan is a professor whose research focuses on the early detection of pancreatic cancer. Dr. Kate Zaytseva is an assistant professor whose research focuses on the role lipid metabolism plays in colorectal cancer.

Fan and Zaytseva received \$50,000 grants to fund their proposed cancer research. The awards were chosen by the UK Markey Cancer Foundation’s Markey Women Strong members.

The Markey Women Strong program started in 2016. It includes philanthropic women and men who want to make a difference in cancer research by funding female researchers at the University of Kentucky. Each member contributes \$1,000 annually. Members work together to choose the grant recipients. Markey Women Strong has provided \$400,000 in grants to female researchers over the last four years.



Solving the glycogen mystery

A breakthrough discovery may provide a new approach for treating non-small cell lung cancers.

Markey Cancer Center researchers looked at the function of glycogen accumulation in the nucleus of a cell. They found that human non-small cell lung cancers accumulate nuclear glycogen during tumor formation. Nuclear glycogen is a carbohydrate energy storage molecule for cells. It was discovered in the 19th century, but didn’t have a known role until now.

The study shows that nuclear glycogen is broken down in the nucleus and that breakdown allows cells to become cancerous. It provides insight into cell metabolism and cancer biology. It also provides possible therapeutic targets for lung cancer treatment.

The multidisciplinary research effort included:

- Dr. Ramon Sun and Dr. Matthew S. Gentry from the UK Department of Molecular and Cellular Biochemistry
- Dr. Christine Brainison from the UK Department of Toxicology and Cancer Biology
- Dana Napier from the Markey Biospecimen Procurement & Translational Pathology Shared Resource Facility

The research was published in *Cell Metabolism*. Funding was provided by Markey, the National Institutes of Health and the American Cancer Society.



New affiliates join Markey Cancer Center Affiliate Network

Two community hospitals joined the Markey Cancer Center Affiliate Network (MCCAN) in 2020. Taylor Regional Hospital provides a full range state-of-the-art cancer care to residents of Campbellsville and a regional service area in the heart of central Kentucky. Mercy Health - Lourdes Hospital in Paducah is a regional referral center for western Kentucky and parts of Illinois, Missouri and Tennessee.

“Through affiliation with the prestigious Markey Cancer Center, we extend UK and the center’s reach into our region so patients have access to Markey’s high-quality cancer resources close to their homes,” said Mercy Health - Lourdes Hospital CEO Michael Yungmann.

The MCCAN, which began in 2006, is a group of 20 Kentucky hospitals that offer high-quality cancer care and programs in their communities with Markey’s support. Patients get top-notch cancer care near their homes, saving them time and money.

“Through affiliation with the prestigious Markey Cancer Center, we extend UK and the center’s reach into our region so patients have access to Markey’s high-quality cancer resources close to their homes.”

MICHAEL YUNGMANN

“We are committed to providing care right here at home for our patients, and now we have a nationally recognized partner that will help us achieve that goal,” said Taylor Regional Hospital CEO Jane Wheatley.



Dr. Timothy W. Mullett, medical director of the UK Markey Cancer Center Affiliate and Research Network

Mullett assumes top leadership role as chair of Commission on Cancer

Dr. Timothy W. Mullett, Markey Cancer Center cardiothoracic surgeon and lung cancer specialist, was recently installed as chair of the Commission on Cancer (CoC).

The CoC is a program of the American College of Surgeons (ACOS). It is a consortium of professional organizations dedicated to improving survival and quality of life for cancer patients. The CoC sets accreditation standards to ensure quality cancer care.

Mullett is the medical director of the UK Markey Cancer Center Affiliate Networks. He has been a member of the cardiothoracic surgery faculty since 1996 and developed UK’s lung transplant program. Mullett was surgical director of Markey’s Multidisciplinary Lung Cancer Clinic from 1998 until 2013. He was diagnosed with liver cancer in 2012, an experience he says made him a better and more understanding physician.

“It is well known that Kentucky leads the nation in incidence of several forms of cancer. I look forward to carrying the flag for the University of Kentucky and representing some of the problems that are amplified in Kentucky cancer care.”

DR. TIMOTHY W. MULLETT

“It is well known that Kentucky leads the nation in incidence of several forms of cancer,” Mullett said. “I look forward to carrying the flag for the University of Kentucky and representing some of the problems that are amplified in Kentucky cancer care, such as rural surgery and cancer care, lung and colon cancer screening implementation, care coordination with NCI-designated programs, and other similar initiatives.”



Grants for colorectal cancer screening and cervical cancer

Two multimillion dollar grants from the National Cancer Institute will fund efforts by the Markey Cancer Center and other institutions to address disparities in the Appalachian region of Kentucky and neighboring states.

Appalachia is home to some of the highest rates of cervical and colorectal cancers in the country. Screenings and other efforts have made a difference. Increased Pap smears and HPV vaccines have reduced cervical cancer rates. But smoking, HPV infection and lack of screening have led to higher-than-average cervical cancer rates in the area. While colorectal cancer screening rates in Kentucky have doubled over the past two decades, access and care are still issues.

An \$11 million project will focus on cervical cancer rates and mortality in the region. The grant went to Markey, The Ohio State University (OSU), the University of Virginia and West Virginia University. Investigators plan to carry out smoking cessation programs, improve HPV vaccination rates and test an at-home HPV testing kit.

A \$5.7 million grant awarded to Markey and OSU will fund improved colorectal screenings and follow-up care. Strategies may include patient and provider education, at-home test kits and in-person colorectal risk assessments.

At Markey, the colorectal study is co-led by Dr. Mark Dignan, professor of internal medicine. Dignan and Dr. Jessica Burris are leading parts of the cervical cancer study. Burris is assistant professor in the UK College of Arts & Sciences and a member of the Cancer Prevention and Control Program.



Big Blue Blast raises funds for cancer treatment and research

The third-annual Big Blue Blast skeet shooting event raised about \$50,000 for the Markey Cancer Foundation. The event was held in July at the Blue Grass Sportsmen’s League just south of Wilmore and in the heart of Kentucky Bluegrass country. It brought together dozens of people for a day of breaking clays and raising funds for cancer treatment and research.

The event is the brainchild of Boone Logan. He created it to honor the memory of his wife, Eunice, who received treatment for stage 4 ovarian cancer at Markey. Eunice battled ovarian cancer for nearly three years before passing away. The couple often used shooting sporting clays as a welcome distraction from the rigors of Eunice’s treatment.

Boone is also a member of Markey Women Strong, a group of male and female philanthropists who donate funds and award grants to Markey women researchers each year.

In recognition of his generous efforts, Boone received the Markey Cancer Center Foundation’s 2019 outstanding volunteer fundraiser award at the National Philanthropy Day celebration.



Philanthropist Boone Logan started the Big Blue Blast as a unique way to bring the community together to fund cancer treatment and research.



Hopkins drives Markey Golf Classic to success

Now in its 16th year, the Markey Golf Classic has raised over \$4 million for cancer research at the Markey Cancer Center.

The 2020 tournament, held at the Lexington Country Club, was originally scheduled for May but was postponed until August because of COVID-19. W. Chapman Hopkins chaired the event for the second year in a row. Hopkins, an attorney, is chair of Stoll Keenon Ogden’s equine litigation group and was named a “Rising Star” by Kentucky Super Lawyers for his work representing equine clients.

“We are so very thankful for Chapman leading this key event and producing such great success during an extraordinarily difficult year.”

FARRA ALFORD SR., BOARD CHAIR, MARKEY CANCER FOUNDATION

“We are so very thankful for Chapman leading this key event and producing such great success during an extraordinarily difficult year” said Farra Alford Sr., chair of the board of the Markey Cancer Foundation.

Golfers participated in the shotgun-start event, which included on-course games between holes, a hole-in-one competition sponsored by Audi of Lexington and prizes for longest drive from L.V. Harkness.



W. Chapman Hopkins, Markey Golf Classic chair



Driving a higher standard in Kentucky

A study published in 2019 showed colon cancer screening rates in Kentucky more than tripled after the state’s Medicaid expansion. But survival rates didn’t increase correspondingly. Dr. Avinash Bhakta, a colorectal cancer surgeon at the UK Markey Cancer Center, wanted to know why.

“We owe it to our patients and to these physicians to give them the support they need.”

DR. AVINASH BHAKTA

Bhakta’s research, recently published in the *Journal of the American College of Surgeons*, used data from the Kentucky Cancer Registry and insurance billing codes. He found many patients in Kentucky don’t receive chemotherapy for locally advanced colon cancer after surgery, particularly patients in the eastern part of the state and Appalachia. Standard-of-care guidelines recommend chemotherapy in most cases to improve survival rates.

Bhakta thinks access to care is an obstacle for many. He also believes physicians need more support to effectively implement the standard of care. He recommends identifying patient navigators who can guide patients through their treatment, and proposes a virtual tumor board, where community doctors work with Markey specialists to determine treatments. “We owe it to our patients and to these physicians to give them the support they need,” he said.

Kentucky ranks first in the nation for colon cancer cases and fifth for colorectal cancer mortality. Any improvements could have a big impact. Bhakta believes the work at Markey is useful beyond the Commonwealth. African Americans have higher incidences of colon cancer and lower screening rates and would likely benefit from a similar focus.



Evers elected to the National Academy of Medicine

Dr. Mark Evers, professor of surgery in the UK College of Medicine and director of the UK Markey Cancer Center, has been elected to the National Academy of Medicine.

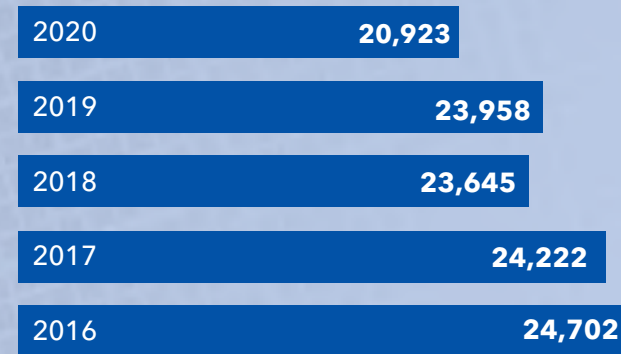
Election to the Academy is considered one of the highest honors in the fields of health and medicine and recognizes individuals who have demonstrated outstanding professional achievement and commitment to service. New members are elected by current members through a process that recognizes individuals who have made major contributions to the advancement of the medical sciences, health care, and public health. A diversity of talent among NAM’s membership is assured by its Articles of Organization, which stipulate that at least one-quarter of the membership is selected from fields outside the health professions – for example, from such fields as law, engineering, social sciences, and the humanities.

Evers is one of 100 new U.S. and international members elected by their peers. According to the Academy, Evers was elected for his expertise on intestinal hormones and hormonal arcades in oncogenesis. His seminal insights defined the role of gut hormones on normal physiology and metabolism, pioneering innovative understanding of neuroendocrine cell biology and the role of neurohormonal pathways in the development and progression of neuroendocrine tumors.

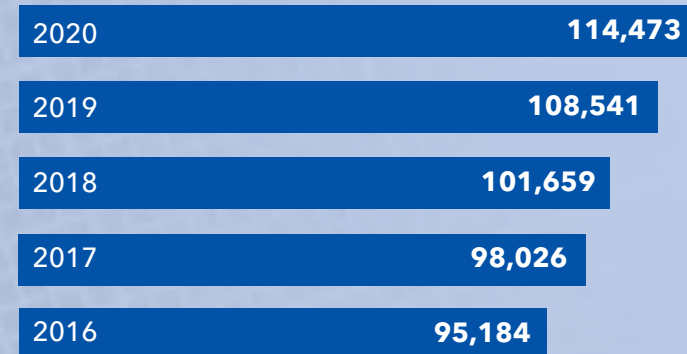
“This distinguished and diverse class of new members is a truly exceptional group of scholars and leaders whose expertise in science, medicine, health, and policy will be integral to helping the NAM address today’s most pressing health challenges and inform the future of health and health care for the benefit of everyone around the globe,” said National Academy of Medicine President Victor J. Dzau. “It is my privilege to welcome these esteemed individuals to the National Academy of Medicine.”

MARKEY BY THE NUMBERS

Radiation oncology treatments by fiscal year



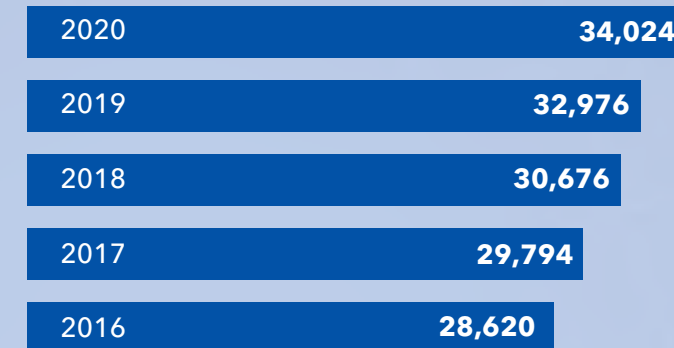
Outpatient neoplasms & hematology visits by fiscal year



Inpatient neoplasms & hematology by fiscal year



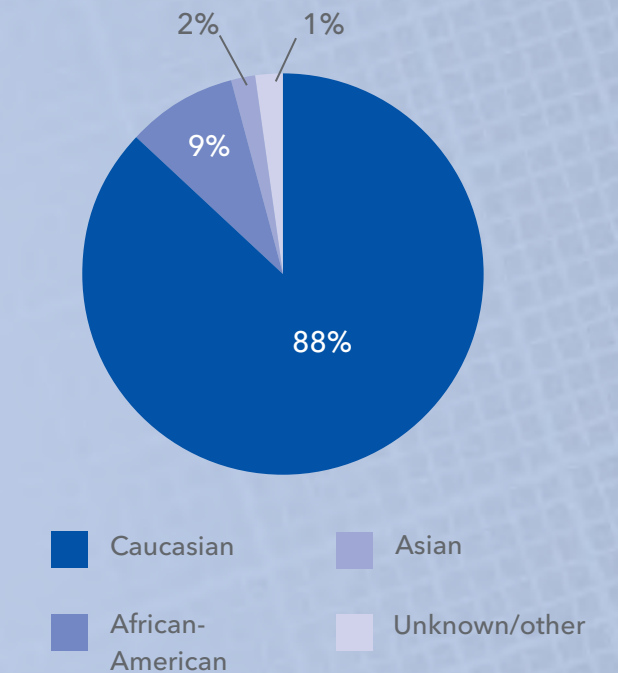
Unique patient neoplasms & hematology by fiscal year



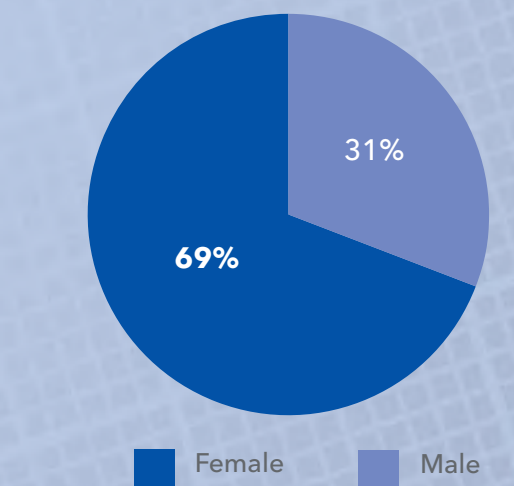
Blood & marrow transplants by calendar year



Unique patients by race, fiscal year 2020

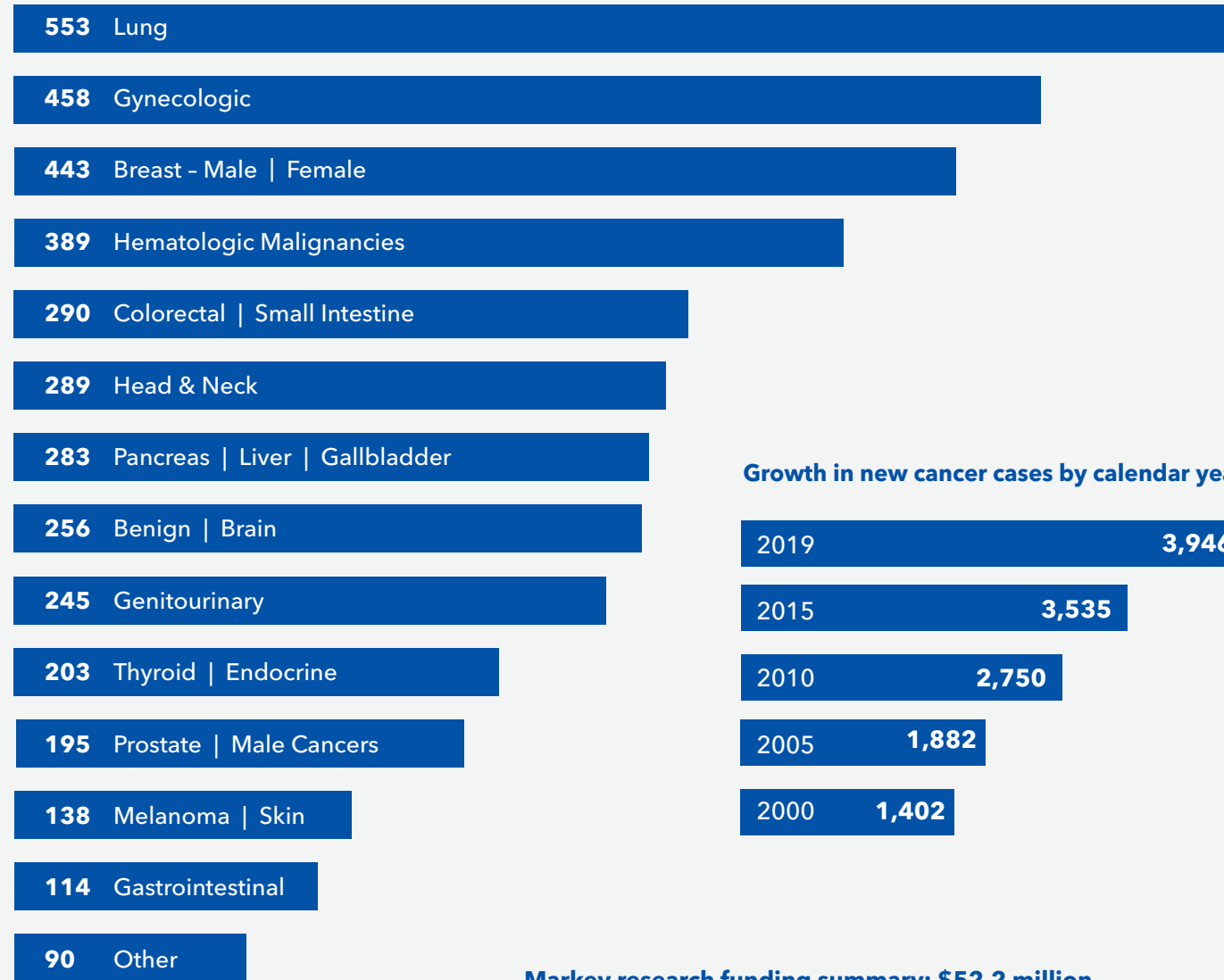


Unique patients by gender, fiscal year 2020



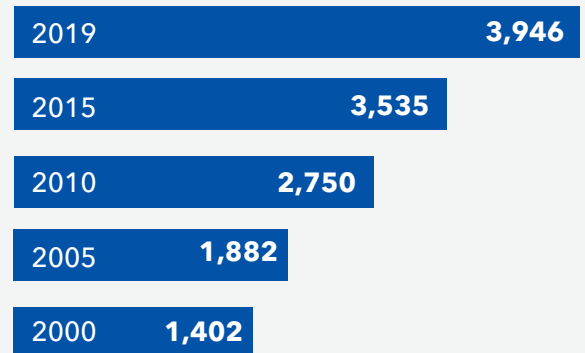
MARKEY BY THE NUMBERS

UK Markey Cancer Center cases by tumor site, calendar year 2019

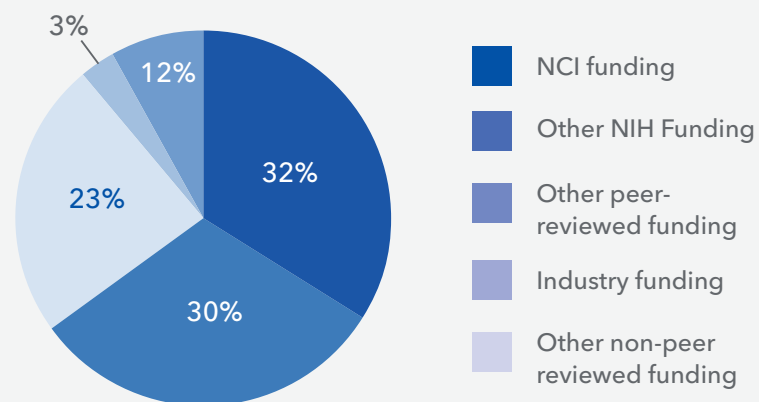


TOTAL 3,946

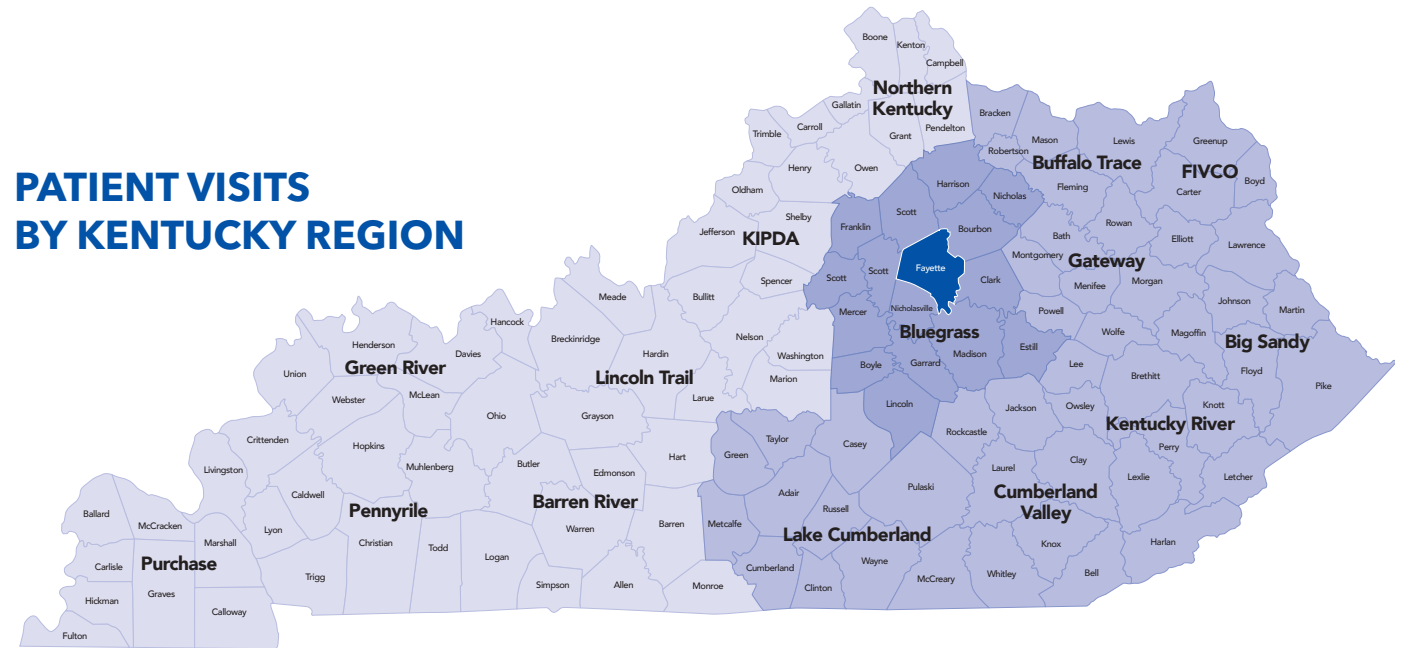
Growth in new cancer cases by calendar year



Markey research funding summary: \$52.2 million (Total costs as of September 30, 2020)



PATIENT VISITS BY KENTUCKY REGION



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

UK HealthCare Market	Kentucky Region	2016	2017	2018	2019	2020
Primary	Fayette	31,532	31,409	33,681	34,943	37,021
	Bluegrass	29,794	31,534	31,391	33,828	38,182
Tertiary	Cumberland Valley	8,339	8,133	8,597	8,691	8,072
	Lake Cumberland	4,931	5,217	5,169	6,073	6,011
	Kentucky River	4,080	4,332	4,841	4,773	4,622
	Gateway	4,000	3,750	3,570	4,073	4,560
	Big Sandy	3,114	3,613	3,577	4,186	4,148
	Fivco	2,351	2,307	2,144	2,431	2,415
	Buffalo Trace	1,894	2,305	2,662	2,711	2,610
Other KY ADDs	KIPDA	1,539	1,608	1,751	1,811	1,523
	Lincoln Trail	1,301	1,307	1,661	1,825	1,687
	Lake Cumberland	737	1,266	1,137	1,309	1,345
	Northern Kentucky	1,060	1,000	985	1,113	1,448
	Barren River	296	336	438	353	412
	Green River	313	348	566	417	478
	Pennyrile	316	215	226	223	421
	Purchase	263	208	179	276	311
	Unknown, Out of State	2,589	2,490	2,644	3,323	2,918
Grand Total		98,449	101,378	105,219	112,359	118,184

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

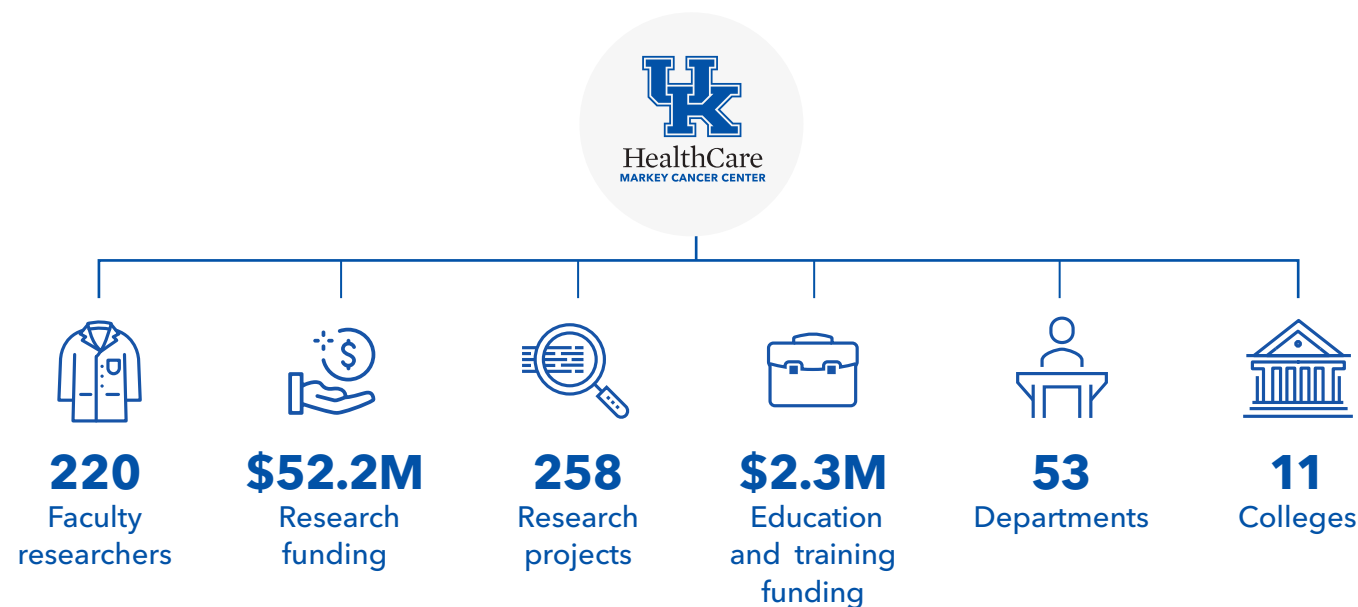
MARKEY BY THE NUMBERS

UK Markey Cancer Center publications, July 2015 to June 2020

Faculty members in the Markey Cancer Center have produced over 1,100 publications in the last five years of NCI designation. Many of these publications represent collaborations between researchers in multiple Markey research programs and with research institutions outside of UK, from across 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 with Other Research Institutions
Molecular and Cellular Oncology	375	33.6%	30.4%	62.1%
Translational Oncology	678	23.2%	23.9%	57.5%
Cancer Prevention and Control	302	17.2%	20.2%	63.2%
Total Unique Publications	1183	26.2%	13.9%	61.9%

The UK Markey Cancer Center, Kentucky's only NCI-designated cancer center, is driven by 258 research projects representing \$52.2 million in research funding. Our research portfolio is supplemented by \$2.3 million in education and training funding. Markey's research efforts across UK include:

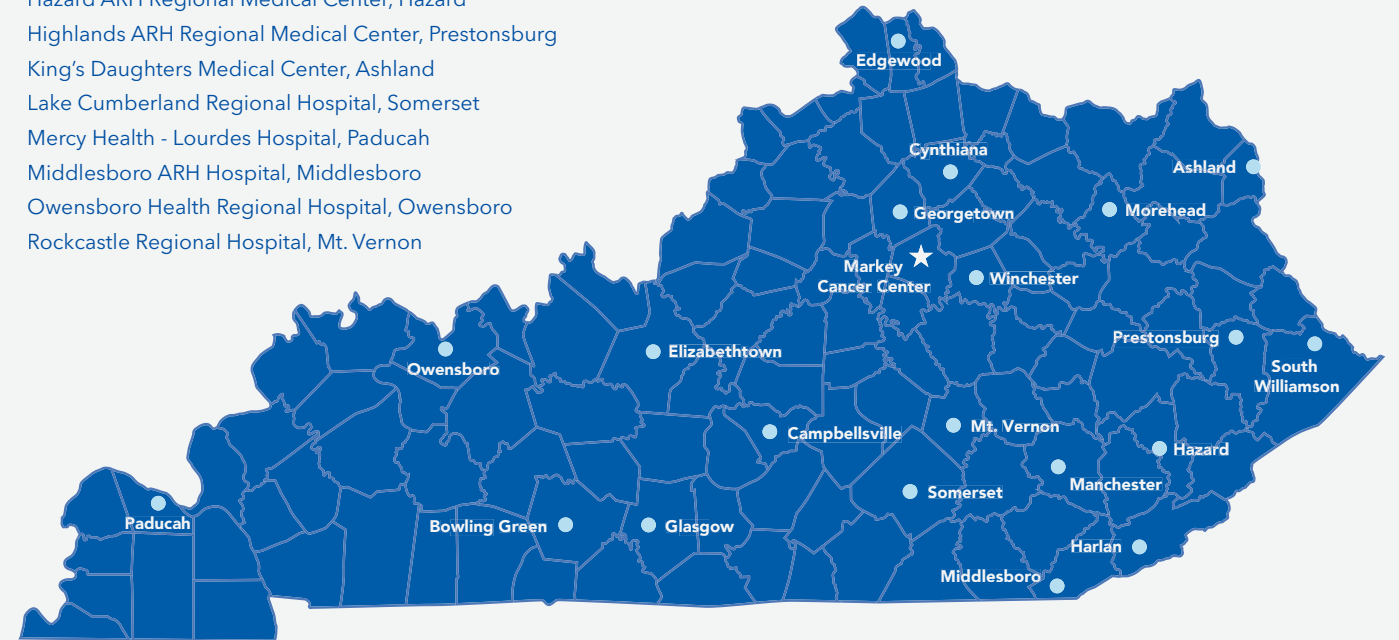


Data as of September 30, 2020

UK MARKEY CANCER CENTER AFFILIATE NETWORK

20 MEMBERS

- AdventHealth Manchester, Manchester
- Baptist Health Hardin, Elizabethtown
- Clark Regional Medical Center, Winchester
- Georgetown Community Hospital, Georgetown
- Harlan ARH Hospital, Harlan
- Harrison Memorial Hospital, Cynthiana
- Hazard ARH Regional Medical Center, Hazard
- Highlands ARH Regional Medical Center, Prestonsburg
- King's Daughters Medical Center, Ashland
- Lake Cumberland Regional Hospital, Somerset
- Mercy Health - Lourdes Hospital, Paducah
- Middlesboro ARH Hospital, Middlesboro
- Owensboro Health Regional Hospital, Owensboro
- Rockcastle Regional Hospital, Mt. Vernon
- St. Claire Regional Medical Center, Morehead
- St. Elizabeth Healthcare, Edgewood
- Taylor Regional Hospital, Campbellsville
- 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

- Baptist Health Hardin, 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





UK MARKEY CANCER FOUNDATION BOARD OF TRUSTEES

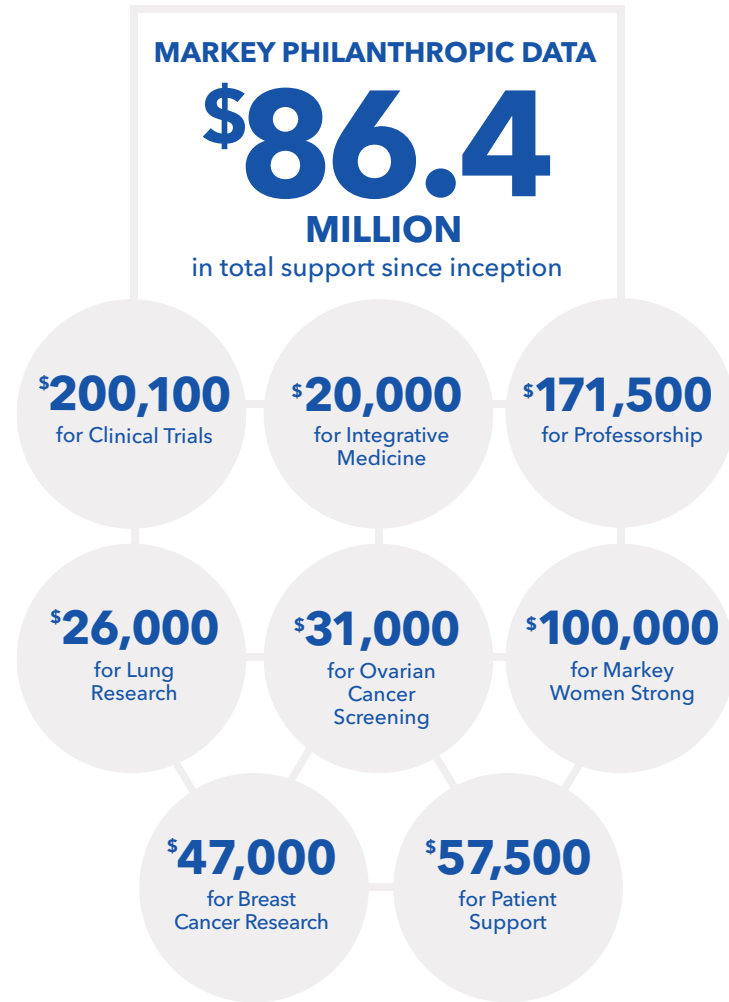
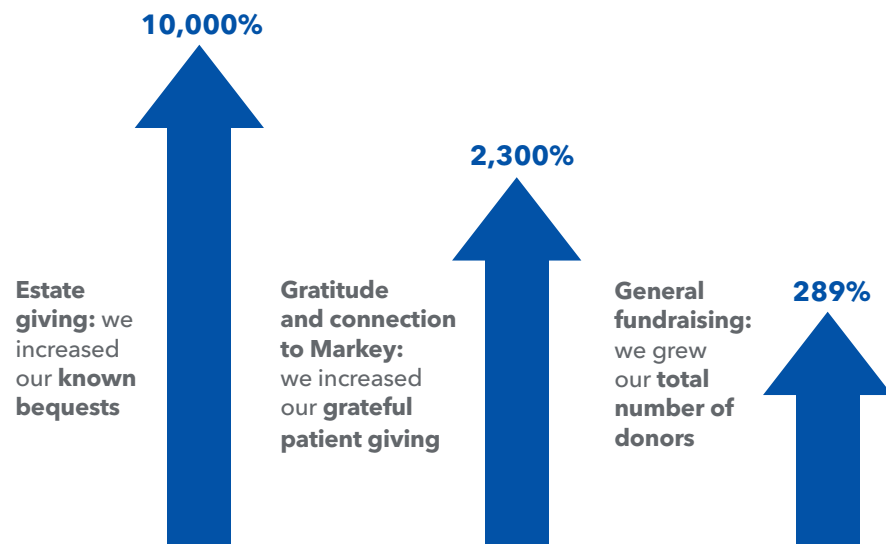
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- Daisy Phipps Pulito
- William J. Shively
- Charles T. Wethington Jr., PhD

- Michael Delzotti, CFRE, FAHP
President & CEO

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**.

FY17-20 Strategic Plan



#29

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, such as NCI, FACT, CoC and Magnet

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

To make a referral: 800-888-5533.

Appointments available: 866-340-4488.

CREDITS

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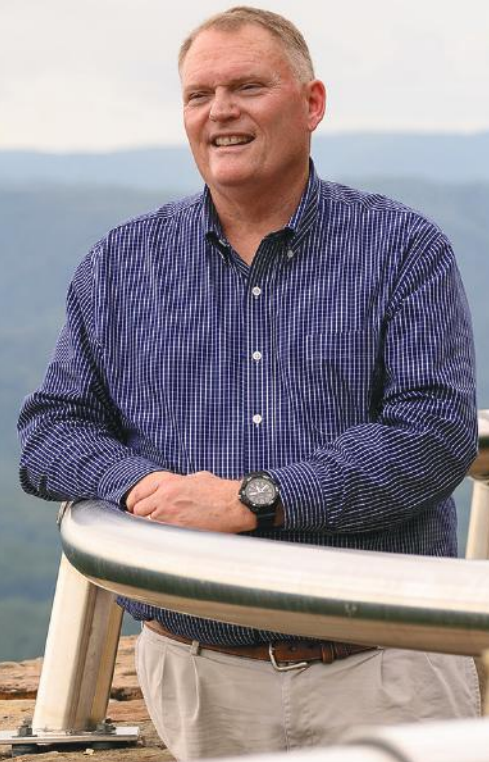
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*"When I was offered a choice,
I knew where I was going without
a moment's hesitation."*

MICHAEL SLUSHER, MARKEY PATIENT



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.

To make a referral: **800-888-5533**. Appointments available: **866-340-4488**.

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