

FOX CHASE Forward

BROADENING THE CONVERSATION ABOUT CANCER | SUMMER 2019



Whether or When

Plotting a Path Through Cancer

CHARTING A PATH

Cancer is complex. It encompasses a myriad of diseases that affect people young and old from all stations in life in many different ways. As diverse as are the diagnoses and the people who face them, so are the choices to be made—about screening, about treatment options, about supportive care, about finances and practical concerns, about facing a new reality and balancing cancer with all of the other people and responsibilities in one's life.

It is overwhelming. It can be unexpected. It certainly has its challenges. But, it is possible to navigate.

In this issue, we examine the many variables that form the backdrop of the cancer experience. It is possible that some of these issues may not have even occurred to you before. In addition, we see the humanity—both the heartache and the triumph—in how people choose to manage this disease and all that comes with it.

We gain insight from the perspectives of those who share the journey in some way, whether it be a physician, genetic counselor, social worker, researcher, speech pathologist, physical therapist, or nurse navigator. They all make up the community of people who join with patients and their family members to cope, to overcome, and to change along with the dynamic experience of living with cancer.

We also stand in awe of our patients, particularly those who so bravely share their stories in these pages, allowing us to understand their perspectives better and how we can move forward in our mission to prevail over cancer.

We'll meet mothers and daughters with a genetic predisposition to cancer, two men who were able to persevere and return to active lifestyles, a young mother whose cancer coincided with one of life's most precious experiences, and others.

Our hope is that you, our readers, will draw inspiration just as we



have, and that you will carry this forth in your own lives to create awareness and to bring support and guidance to those in your life who may need it.

Richard I. Fisher, MD
PRESIDENT AND CEO

FOX CHASE Forward

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FOX CHASE CANCER CENTER AND CHINA'S BEIJING FRIENDSHIP HOSPITAL LAUNCH COLLABORATION

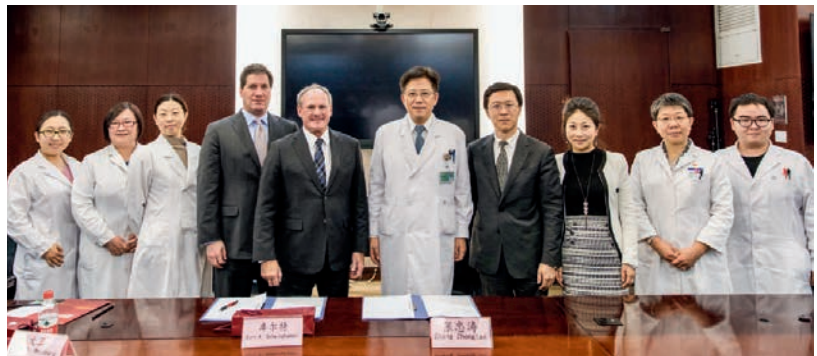
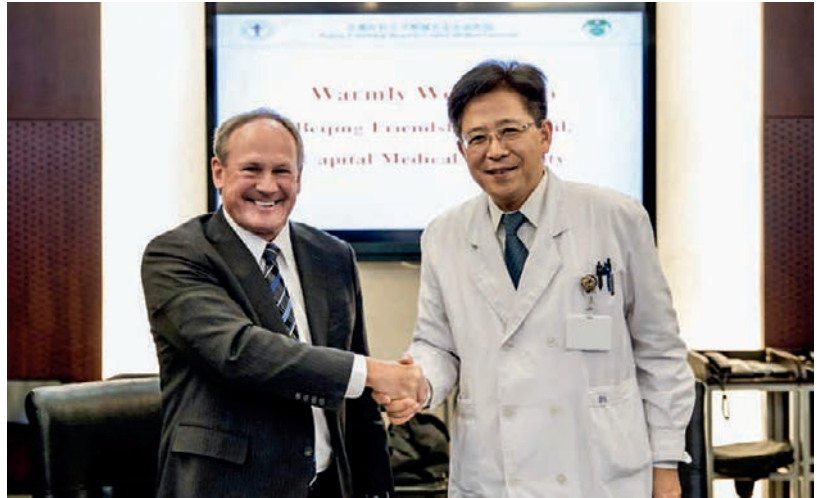
Fox Chase Cancer Center and Beijing Friendship Hospital in Beijing, China, have initiated a collaborative agreement that will provide both institutions with added capability in cancer clinical trials. Under the agreement, Fox Chase will provide consultative services to enhance Beijing Friendship Hospital's existing clinical trial capabilities. In the future, the Chinese hospital hopes

“Our researchers are gaining access to a large pool of new patients for their clinical trials, their researchers are gaining opportunities to participate more extensively in clinical trials, and of course, patients in Beijing may have expanded access to novel cancer therapies.”

— RICHARD I. FISHER,
PRESIDENT AND CEO OF FOX
CHASE CANCER CENTER

to expand its own trials, while serving as a site for Fox Chase to conduct studies suitable for multiple, diverse populations.

Elin R. Sigurdson, director of surgical oncology at Fox Chase, helped initiate the relationship. “This collaboration has the potential to expand access to clinical



trials, and to strengthen the trials themselves,” she said.

The agreement was finalized at a recent meeting in Beijing attended by leaders from both institutions, including Kurt Schwinghammer, chief business development officer, and David Weinberg, chief medical officer of Fox Chase International. The mission of Fox Chase International is to export skills and expertise in cancer prevention, detection, and treatment, and to establish advanced cancer treatment centers abroad in accordance with applicable laws and regulations.

Richard I. Fisher, president and CEO of Fox Chase, sees many

Top: Kurt Schwinghammer, chief business development officer of Fox Chase International, and Zhongtao Zhang, deputy president of Beijing Friendship Hospital. Bottom: Officials from both hospitals during a site visit in Beijing

advantages for all involved. “Our researchers are gaining access to a large pool of new patients for their clinical trials, their researchers are gaining opportunities to participate more extensively in clinical trials, and of course, patients in Beijing may have expanded access to novel cancer therapies,” he said.

This agreement is one of several projects Fox Chase International has ongoing in China.

HELPING HIGH-RISK POPULATIONS IN THE CARIBBEAN

BRCA mutations appear more frequently in Bahamians than in other populations, and people of African descent living in the Caribbean islands have higher risk for prostate and breast cancer than other people.

The African-Caribbean Cancer Consortium (AC3), a group dedicated to increasing research capacity in the Caribbean to investigate cancer trends, recently took action to empower health providers to deal with these challenges.

Three advanced practice nurses from Princess Margaret Hospital in Nassau, Bahamas spent two weeks at Fox Chase for in-depth training on genetic counseling. This was possible through an ongoing collaboration with Robin Roberts, director of the University of the West Indies, Bahamas and co-leader of the prostate cancer research working group in AC3.

On separate visits hosted by the Risk Assessment Program, Raquel Johnson, Monique Forbes, and Jannah Khalfani, learned about

epidemiology best practices and observed genetic counselors and clinicians in high-risk breast and prostate clinics. Now, they have routine consultations on genetic testing and counseling with experts at Fox Chase.

On separate visits hosted by the Risk Assessment Program, Raquel Johnson, Monique Forbes, and Jannah Khalfani, learned about epidemiology best practices and observed genetic counselors and clinicians in high-risk breast and prostate clinics.

Camille Ragin, an associate professor in the Cancer Prevention and Control Program at Fox Chase, who founded and leads AC3, led the exchange. Through AC3, Ragin works to further the study of genetic, lifestyle, and environmental cancer risk among persons of African ancestry.

Roberts and Ragin began a pilot project at Princess Margaret Hospital offering genetic testing to Bahamian men at risk for prostate cancer. Johnson, Forbes, and Khalfani will provide genetic counseling to these patients. Their goal is to eventually provide a range of genetic screening services to reduce cancer risk among Bahamians.



KATIA BULBENKO

AN UNEXPECTED EXPLANATION FOR MYSTERIOUS SIDE EFFECTS OF ANTI-INFLAMMATORY DRUGS

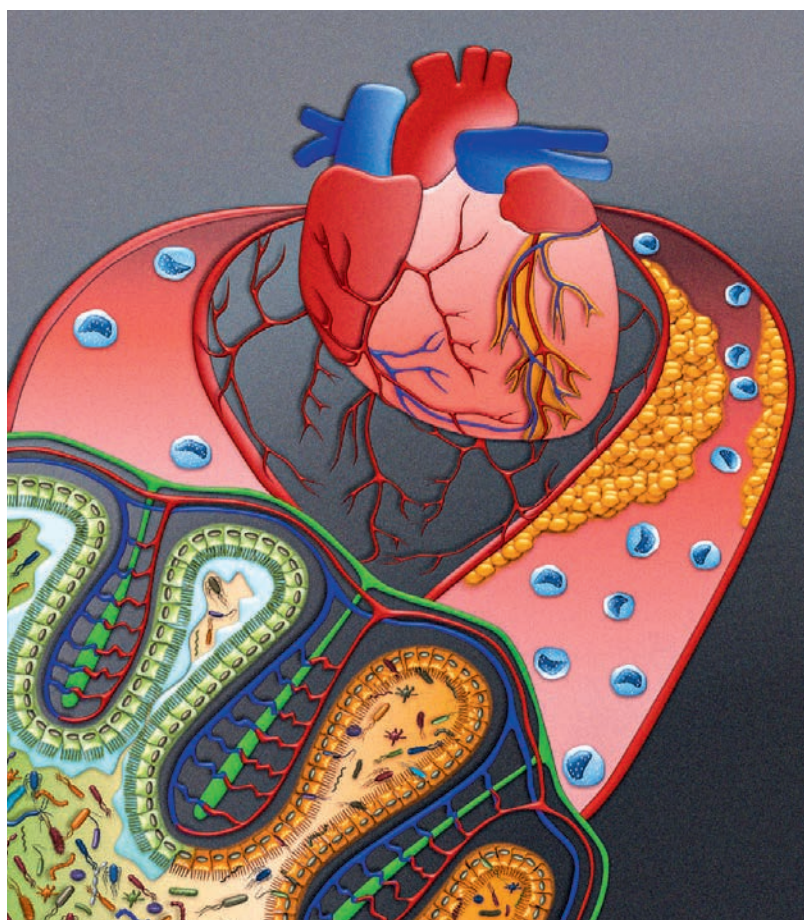
Cancer patients and survivors have at least three-fold higher risk of cardiovascular disease compared with people at average risk. Inflammation and its mediators, cytokines, are implicated in both cardiovascular disease and cancer. It is generally believed that inhibiting inflammation could help reduce the risk of both diseases.

Aliia Fatkhullina, a graduate student, and Ekaterina Koltsova, associate professor in the Blood

“The expectation in the field was always that inactivation or neutralization of inflammatory cytokines, specifically IL 23, would suppress atherosclerosis progression, however we found that ablation of IL 23 or its target IL 22 strongly promoted inflammatory cardiovascular disease.”

— EKATERINA KOLTSOVA,
ASSOCIATE PROFESSOR IN THE
BLOOD CELL DEVELOPMENT
AND FUNCTION PROGRAM AT
FOX CHASE CANCER CENTER

Cell Development and Function Program at Fox Chase Cancer Center, recently discovered that certain cytokines impact diet-induced atherosclerosis, the build-up of plaque in the arteries.



They published their paper in the journal *Immunity*.

“The expectation in the field was always that inactivation or neutralization of inflammatory cytokines, specifically IL 23, would suppress atherosclerosis progression, however we found that ablation of IL 23 or its target IL 22 strongly promoted inflammatory cardiovascular disease,” Koltsova said.

IL 23 inhibitors have been used to treat various conditions, such as inflammatory bowel disease, multiple sclerosis, rheumatoid arthritis, and others. Some human studies of these drugs showed

major cardiovascular events, but they were regarded as coincidental side effects without any molecular explanation.

“Our results revealed unexpectedly that the absence of IL 23 and IL 22 protein regulators of inflammation accelerate atherosclerosis due to expansion of intestinal bacteria capable of producing pathogenic metabolites, involved in cardiovascular disease development,” Koltsova said.

These findings help explain why some patients being treated for a range of inflammatory diseases experience adverse cardiovascular events.

RESEARCHERS RECOMMEND RISK-ADAPTED APPROACH TO GUIDE KIDNEY CANCER SURGICAL DECISIONS

After analyzing more than 1,300 kidney cancer cases, Fox Chase Cancer Center researchers concluded that a tumor's location in the hilum, where the key blood vessels and drainage tubes of the kidneys live, is not by itself a reason to remove the entire kidney. Instead, other factors should provide more weight in the decision about whether to do a partial or a radical nephrectomy (removal of a portion of the kidney or the entire kidney).

The report, entitled, "Renal Hilar Lesions: Biological Implications for Complex Partial

Nephrectomy," appeared in the January 2019 edition of the journal *Urology*. The study was conducted by Fox Chase's urologic oncology team, and led by Robert G. Uzzo, chair of the Department of Surgical Oncology.

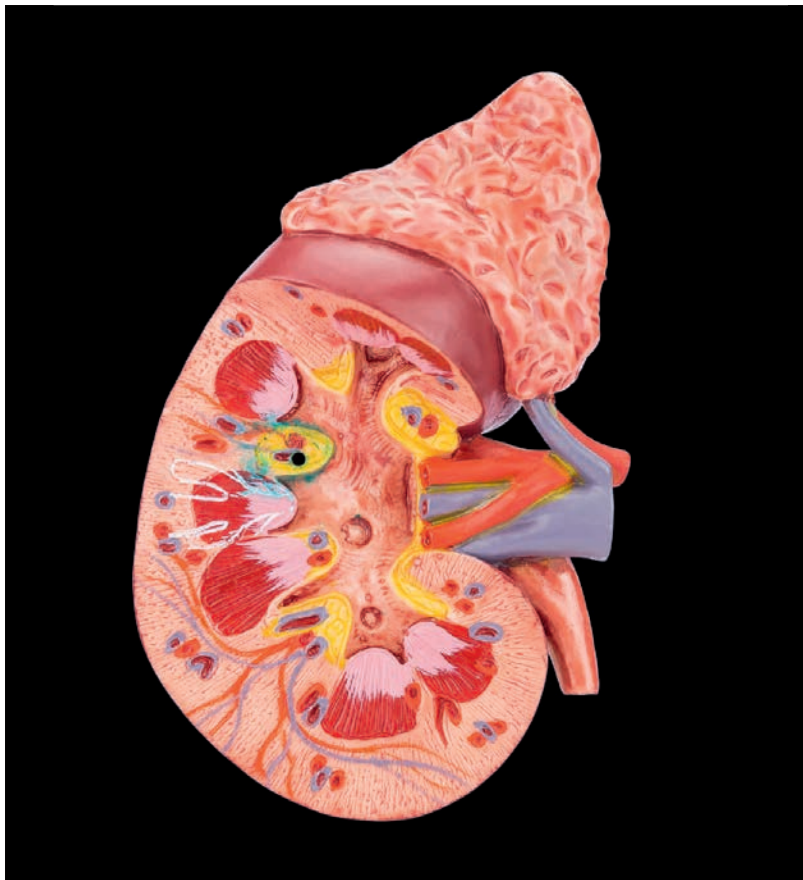
The study showed that renal tumors on the hilum exhibited no significant difference in malignancy rate, grade, or stage compared with lesions elsewhere in the kidney. Hilar lesions had an 87.2 percent chance of being malignant, while nonhilar lesions were malignant in 82.6 of the cases. The rate of aggressive disease

The study showed that renal tumors on the hilum exhibited no significant difference in malignancy rate, grade, or stage compared with lesions elsewhere in the kidney.

was similar, too, at 39.8 percent for hilar lesions versus 34.3 percent for nonhilar lesions. The researchers noted that increasing mass size, rather than location, was the main determining factor for identifying aggressive hilar tumors.

"Renal lesions located near the hilum present a treatment quandary to the treating physician due to difficulties with preoperative biopsy and the technical complexity associated with a nephron-sparing procedure," the group wrote.

In response to the findings, Uzzo and his team recommended that differences in surgical risks, perioperative complications, surgical experience, and functional considerations be at the core of decision-making for addressing hilar lesions. Uzzo's kidney cancer team at Fox Chase is one of the most experienced in the country, and is often able to perform very complex hilar partial nephrectomies in cases where patients were told they needed to have the entire kidney removed.



BEN SCHONEWILLE, DREAMSTIME



WHEATHER OR WIHEN

Plotting a Path Through Cancer

BY PAIGE ALLEN
ILLUSTRATION BY MARK SMITH

The journey through cancer treatment is one with many forks in the road. Patients are faced time and again with decisions about how, where, when, and even whether to receive care.

Is surgery the best option? What about chemotherapy? Where should I go for treatment? Do I need a second opinion? Should I look for a clinical trial?

Sometimes, those choices start before cancer appears. For some people at high risk, the choice is whether to act before the cancer can come or whether to wait, screening meticulously.

For others, the decisions must be made when the cancer is found but treating it could pose greater danger than the disease likely would.

A choice emerges for people in this situation—take the risks of surgery or watch and wait.

The choices are plentiful, and they are never easy.

As doctors learn more about genetic links to cancer, cancer risk, and responses to treatment, even more paths open up. Some drugs are targeted at specific genetic mutations. A patient's family and genetic history can indicate the need for earlier and more frequent screenings aimed at finding some cancers at the most treatable, early stages. Informing people about an inherited increased risk of cancer empowers them to take action—by increasing screening or undergoing risk-reducing surgeries—that can save their lives. In these cases, knowledge is power.

But in some cases—particularly in a group of men with slow-growing prostate cancer—knowledge is not power. Acting on it can be harmful. Doctors have determined that some prostate cancer is so slow-growing that patients have a greater risk of being harmed by treatment than by the disease. These men have a good chance of living well without treating their cancer. In these cases, doctors rely on active surveillance, using frequent blood and imaging tests to monitor the cancer. If the cancer doesn't grow or only grows incrementally, patients can be spared the ordeal of treatment. But if the cancer shows signs of spreading, doctors can quickly intervene before it progresses. Although it sounds like a good bargain, choosing this path can be difficult.

ASSESSING CANCER RISK

Mary Daly, a medical oncologist at Fox Chase and a pioneer in the field of cancer genetics, established one of the first risk assessment programs

in the country in 1991 for individuals with a family history of certain types of cancer.

In the more than 25 years since the program began, it's expanded from breast and ovarian cancer to include risk assessment for prostate, gastrointestinal, lung, melanoma, and kidney cancer.

"It's a field that changes every single day," Daly said.

Up to 10 percent of diagnosed cancers will link back to a hereditary trait, and a host of gene mutations increase the risk of a myriad of cancers.

In women, the BRCA1 and BRCA2 gene mutations increase the risk of breast, ovarian, fallopian tube, and peritoneal cancers.

The BRCA1 gene mutation gives women a much greater chance of developing breast cancer; 72 percent of women with this mutation will develop breast cancer by the age of 80 compared to 12 percent in the general population. It also drastically increases the odds of ovarian cancer. While just over one percent of women will be diagnosed with

ovarian cancer by age 80, 44 percent of women with the BRCA1 mutation will.

The risk is slightly lower, but still high for women with the BRCA2 mutation; 69 percent of women will develop breast cancer and 17 percent will develop ovarian cancer by the age of 80.

The BRCA1 and BRCA2 mutations also heighten the risk of fallopian tube and peritoneal cancers. In men, the BRCA2 gene increases the risk of breast cancer and prostate cancer. Both men and women with the mutations have

a greater risk of pancreatic cancer.

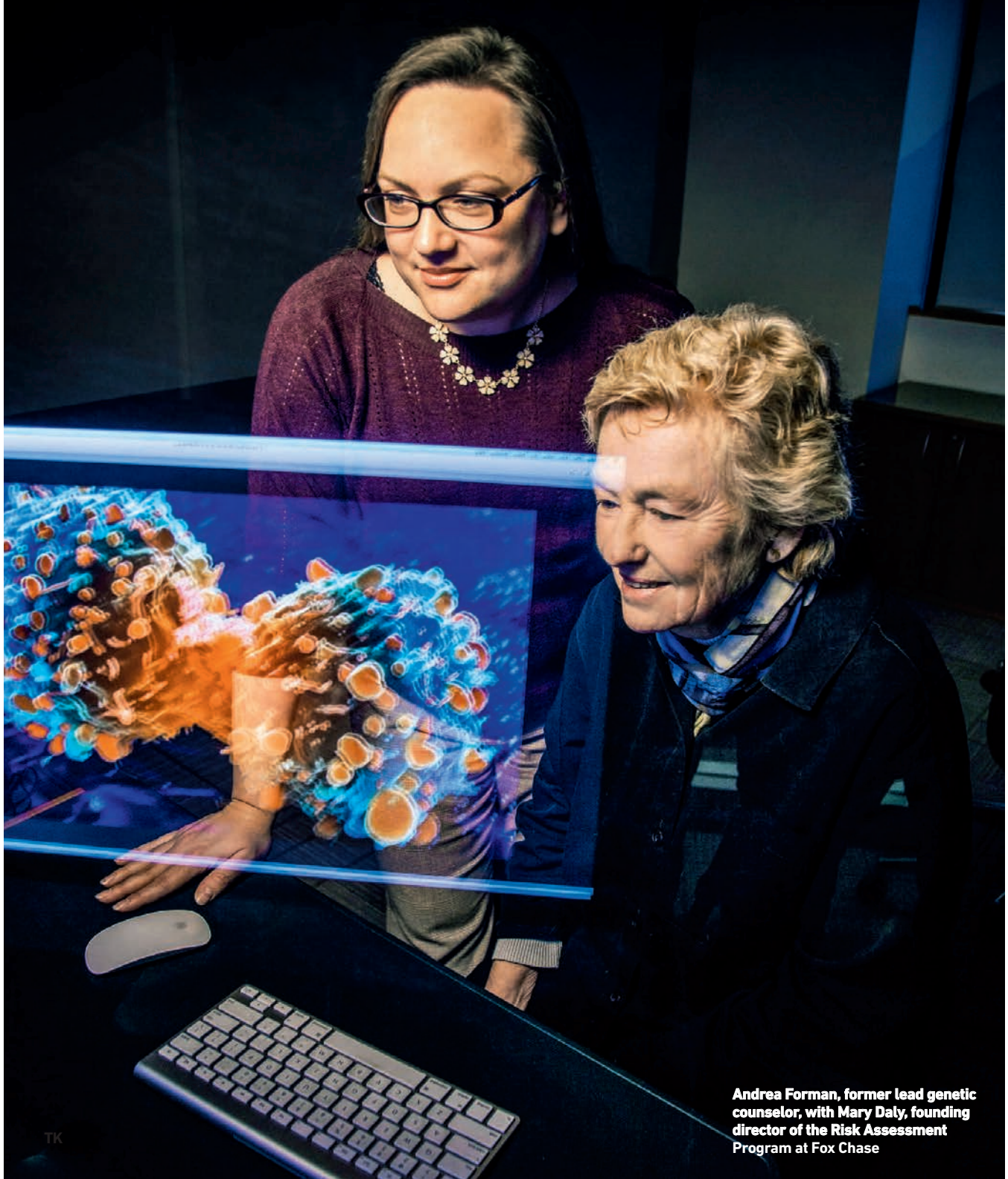
While the BRCA gene mutations get much attention and grab headlines—actress and activist Angelina Jolie started a national discussion in 2013 when she had a preventive mastectomy after testing positive for the mutation and again in 2015 when she had her ovaries removed—other gene mutations can be dangerous as well. There are numerous genetic mutations in other genes that are known to elevate the risk of developing different types of cancer.

Lynch Syndrome, which can be caused by a mutation in a number of genes, greatly increases risk for colorectal cancer. It also increases the risk for endometrial cancer and cancer of the ovary, stomach, small intestine, pancreas, kidney, brain, ureters, and bile duct.

The lifetime risk of developing colorectal cancer for both men and women is just over four percent; this risk is slightly higher for men. For those with Lynch Syndrome, however, that risk shoots up; between 60 and 80 percent of men with Lynch Syndrome will develop colon cancer.

“If I had known when I was younger, I may have made the decision to have a mastectomy to try and avoid the cancer I felt I was doomed to have.”

— BILLIE RADOSIN,
BREAST CANCER SURVIVOR



Andrea Forman, former lead genetic counselor, with Mary Daly, founding director of the Risk Assessment Program at Fox Chase

Women with Lynch Syndrome have a 40 to 60 percent lifetime risk of developing colon cancer, as well as a 40 to 60 percent risk of endometrial cancer.

“We see 28 year olds with colon cancer and patients in their 30s with aggressive breast cancer,” Daly said. “With these mutations, they’ve had a head start on the path to cancer.”

The goal of the Risk Assessment Program is to identify genetic mutations, allowing patients an opportunity to act, either through risk-reducing surgeries or increased screening.

Some patients opt for risk-reducing surgeries, like prophylactic mastectomy or oophorectomy. They are relieved, knowing that they’ve significantly lowered their risk. Others choose to increase screening measures – starting at an earlier age and having the tests more frequently – so that if they do develop cancer, they will be in a position to act quickly.

“Regardless of their choice, they have a lifelong awareness of this mutation,” Daly said. “With this knowledge, we can try to head off this genetic predisposition and intervene before the cancer has a chance to truly develop.”

A DIFFICULT DECISION

Rebekah McLendon never thought taking a mass-market genetic ancestry test would lead to having her ovaries removed. But that’s what happened when the test revealed she had the BRCA1 mutation. McLendon initially took the test a few years ago to find out more about her background. A little over a year ago, she received a notification that she had new health information available.

McLendon notified her gynecologist of the result and was urged to get screened and talk to a genetic counselor. She came to Fox Chase with her mom – an ovarian cancer survivor herself. After getting confirmation of her BRCA-positive status, McLendon elected to have a prophylactic mastectomy and oophorectomy.

“It’s my personality to take things head on and I just wanted to take care of it and get it out of the way,” she said. “Having my ovaries removed put me into immediate menopause, but there was no question for me.”

While she was sure about having her ovaries removed, McLendon was less sure about having the mastectomy. While it had initially made sense to have the surgeries at the same time and get everything done at once, she started to wrestle with the choice.

“The further I got into it, the realization of all that I was

losing became greater,” she said. “I was going to be put into menopause immediately, I was losing my breasts and even with reconstruction, I was losing all of that sensation. There was so much change and I worried about losing my femininity all at once.”

Since ovarian cancer, not breast cancer, was more prevalent in her family, and breast cancer is easier to screen for, McLendon decided to hold off on the risk-reducing mastectomy. She has mammograms and MRIs every six months in an attempt to catch any cancer that might appear.

McLendon is grateful that she has the time to make these big decisions without the pressures a cancer diagnosis can bring.

“This is all preventive. I don’t have to undergo these surgeries right now; I can revisit the choice at a later point when it makes more sense for me,” she said. “It’s a very personal decision.”

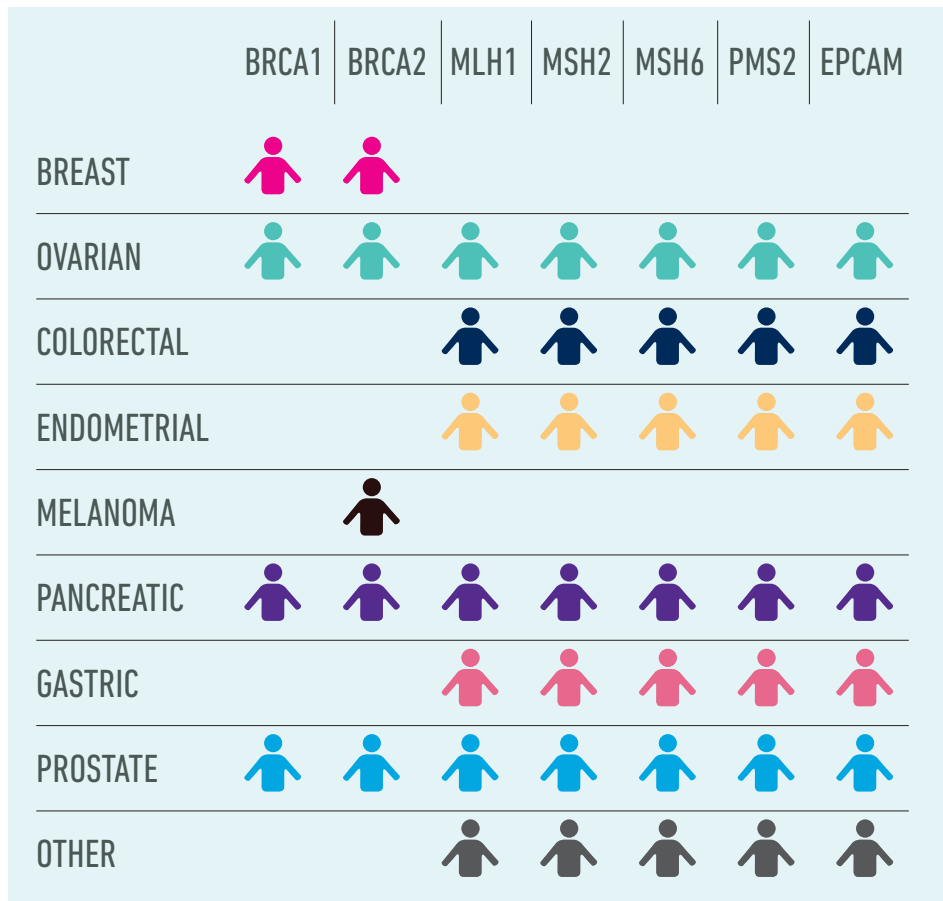
LIKE MOTHER, LIKE DAUGHTER

When Bonnie Ettenger first felt a lump in her breast at age 32, she wasn’t surprised at all. Her mother, grandmother, and great-grandmother had all had breast cancer. She was positive for the BRCA1 gene mutation. She knew in her gut that it

was a matter of when, not if, she would get a breast cancer diagnosis too. In the five years since she learned she had the mutation, she had increased her screening frequency.

Ettenger sought genetic testing at 27, a few years after her mom had been diagnosed with breast cancer. For women with an average risk of breast cancer, yearly mammograms are recommended starting at age 40. When Ettenger tested positive for the BRCA1 mutation, she began having mammograms and MRIs every six months. At the beginning of 2018, she felt discomfort in her breast, and thought that it might be scar tissue from having a benign lump removed previously. This time, it wasn’t benign. It was the cancer she had been expecting.

“The hardest thing was having to tell my parents,” she said. “My mom had been through treatment herself and had watched her mother go through



it too. Now she was going to have to watch as I went through treatment.”

Parents who have the BRCA1 or other genetic mutations have a 50 percent chance of passing it on to their children. Often, they can feel an overwhelming amount of guilt for passing along the bad gene, said Michelle Savage, a genetic counselor at Fox Chase.

“The main reason many patients who already have cancer want to be tested is because they want to know for their kids’ sake,” Savage said. “It’s tough information to know, but now we can do something about it. And that makes a huge difference.”

Ettenger’s mother, Billie Radosin, always knew she would get breast cancer but lived most of her life without having the science to back her feelings up. Most of the women in her family – her mother, grandmother, aunts, and cousins – had breast cancer and some had ovarian cancer. She figured it was only a matter of time before she had it too.

“I always felt like I was going to get breast cancer,” she said. “I was always looking over my shoulder, waiting for it to come.”

When Ettenger was born, Radosin fretted that her daughter would someday have the same cancer that plagued their family. And while she was right, it was Radosin’s own diagnosis at the age of 57 that prompted them both to get screened for the BRCA1 gene and finally get an answer as to why their family was hit so hard.

“It is empowering to know,” Radosin said. “If I had known when I was younger, I may have made the decision to have a mastectomy to try and avoid the cancer I felt I was doomed to have.”

Radosin feels some guilt for passing mutation on to Ettenger, but Ettenger is grateful for the knowledge that led her to get screened more intensely at a younger age.

“My cancer was caught early because we knew to look for it,” she said. “My cancer is aggressive but I have a good prognosis because we found it so early.”

WHEN NO TREATMENT IS THE BEST CANCER TREATMENT

On the other end of the spectrum from patients like McLendon and Ettenger are those who find out they have cancer, and that the best course of action is to keep a close eye on it, and do nothing else.

“Prostate cancer treatment comes with risks like incontinence, erectile dysfunction, and infertility,” said Rosalia Viterbo, a surgical oncologist at Fox Chase. “What if we

don’t have to take that path? Do we have the technology to safely watch and monitor our patients? At this point, we do.”

Many patients can stay on active surveillance for years, and can avoid quality of life issues that can come with surgery, radiation, and chemotherapy.

“Especially in younger patients, active surveillance can really extend the timeline,” Viterbo said. “It allows patients who were diagnosed when they were young and single to get married and have kids before they need treatment.”

REASSURE ME

It can seem strange and anxiety provoking for patients to have cancer and not immediately start treatment, Viterbo said, but there are many ways they can take control of the situation.

Patients on active surveillance are encouraged to maintain a healthy lifestyle by eating a healthy and balanced diet and exercising frequently. Additionally, active surveillance only works for patients who have the ability to be proactive about their health and keep up with continued visits to the doctor’s office.

In an effort to alleviate the stress that active surveillance can bring, Fox Chase is running Reassure Me, an eight-week health promotion and lifestyle wellness program. The study tests health and wellness interventions, to determine if they should be incorporated into the care plan for patients on active surveillance.

SCREENING RESPONSIBLY

Screening for cancer is one of the most important things a person can do to take charge of their health. Still, it’s vital to adhere to recommended guidelines in order to avoid over-treatment. Similarly, while knowing about genetic history can save lives, patients have to be ready for what the knowledge means.

“Timing is so important. Are you sure you want to do this now? Are you ready to know this information and make the choices necessary based on this information?” Savage said.

Sometimes patients know what they want to do right away, and other times, they need help talking through their options. Genetic professionals can help patients decide what course of treatment is right for them.

“The decision-making process is a journey, and you shouldn’t be expected to make a life altering decision like having a risk-reducing mastectomy immediately,” she said. “Knowledge is power, but you have to be ready for what it will bring. You can go from seemingly healthy to having this heavy weight placed on you in a split second. We can help work through that.” ♦

“What if we don’t have to take that path? Do we have the technology to safely watch and monitor our patients? At this point, we do.”

— ROSALIA VITERBO,
SURGICAL ONCOLOGIST

Life Interrupted



How Cancer is Different in Young Adulthood

Joey Sankey's life has revolved around courts and fields. The youngest of three, he and his brothers grew up playing every sport under the sun, with lacrosse as their favorite. Sankey played through high school and then for the University of North Carolina, where he became the school's all-time points leader. From there, he shifted into coaching and playing professionally. He was named Rookie of the Year in Major League Lacrosse. At 27, he was as healthy and strong as ever – until he wasn't. Of all the challenges he thought his twenties would bring him, cancer wasn't one of them.

Lauren Ricottone went for a colonoscopy after experiencing rectal bleeding; as a nurse, she knew it was abnormal and she should get it checked out. Before she could be put under anesthesia for the procedure, a routine pregnancy test came back positive; she was pregnant with her first child. Hemorrhoids seemed like a logical reason for the bleeding, especially once she learned she was pregnant. There was no reason at age 34 to think that it was cancer. Ricottone's cancer arrived just a few weeks after

her daughter. She expected sleepless nights and stress from adapting to life with a newborn. But balancing a new baby with cancer treatment? That wasn't something she was expecting.

Finding Their Footing

The American Cancer Society estimates that 1.7 million people will be diagnosed with cancer this year. Just 60,000 will be between the ages of 20 and 39. A cancer diagnosis is disruptive at any age, but can be especially difficult for young people who were seemingly healthy. Instantly, the life they thought they knew is replaced with a new reality. Decisions that seemed years away suddenly need immediate attention.

All at once, a thousand thoughts come to mind. I'm not ready for kids right now but do I want them someday? Will there be enough money to cover rent, student loans, and medical bills? If I'm too sick to work, will I still have insurance?

Will it be possible to live on my own right now? Is it weird

BY PAIGE ALLEN

ILLUSTRATION BY ASAF HANUKA



ONE
WAY
←

to have my mom and dad taking care of me again? Is anyone going to want to date me with this kind of medical baggage?

“For young patients, it can feel a bit like a boomerang: you just left home and gained your independence and now you’re being yanked back with no warning,” said Anjali Albanese, a social worker at Fox Chase Cancer Center.

Treating this population often requires a team approach of oncologists, social workers, and psychologists who can offer ways to treat both the cancer and the patient’s other concerns.

“Many of our patients were already juggling a lot of roles before they became sick,” said Emmie Chen, director of the section of psychiatry at Fox Chase. “Being a parent, having a career, caring for elderly parents...Cancer treatment can be a full time job and you may find you need to pause and take care of yourself. We’re here to help people prioritize and get the help they need to do that.”

Rising Cancer Rates

Advanced age is the top cancer risk factor and one nobody can help. But some cancers appear almost exclusively in young adults, and others are on the rise.

A 2010 study by Joshua Meyer, a radiation oncologist at Fox Chase, found new cases of colon cancer and rectal cancer occurring at an increasing rate among young and middle-aged adults in the United States. People born in 1990 have double the risk of colon cancer and quadruple the risk of rectal cancer compared to people born around 1950. In 2018, the American Cancer Society lowered the age for starting recommended colorectal cancer screening from 50 to 45.

While doctors know that colorectal cancer is on the rise in young people, there isn’t evidence pointing at any one cause, said Meyer who treats gastrointestinal cancer. Researchers have looked into ways young patients are different and studied genes to see if a mutation could be to blame.

“People wonder if it’s environmental, if our diets are to blame, if it’s something we’re ingesting with our food,” he said. Getting statistics on young people with colorectal cancer is difficult, Meyer said, because the vast majority of patients with the disease are still people over the age of 50.

“We’re talking three to 10 percent of the population, and getting numbers based on this small population is difficult.”

A recent study examined the effectiveness of rectal cancer therapy. Patients under 50 didn’t derive the same benefits from recommended treatment as patients over the age of 50, suggesting that there may be a biological difference in the cancer appearing in young patients.

“The guidelines are written leaning on evidence from patients with a median age of 65,” Meyer said. “These therapies may not be optimized for younger patients. The problem is, we don’t know what better treatments are.”

Facing Side Effects for Life

Treating young adults with cancer can be complicated both medically and socially, said Daniel Geynisman, a medical oncologist at Fox Chase. Geynisman specializes in treating germ cell tumors, which arise from reproductive cells and appear most often in young men.

“On the one hand, young adults are a healthy group and can typically tolerate treatment well,” he said. “But they have decades of life to live, and the challenge becomes balancing treatments and oncologic efficacy with minimizing long-term side effects.”

Some chemotherapy drugs may cause side effects like neuropathy, hearing loss, ringing in the ears, infertility, and in some cases, secondary cancers. Physicians need to consider how to mitigate them.

Joey Sankey’s doctors hoped that surgery would be all he needed, but he wound up needing four rounds of chemotherapy. He was quickly overwhelmed by the list of things that could happen as a result of the drugs intended to save his life.

“The doctor tells you about all the things that could happen and it gets scary, because they have to prepare you for the worst,” he said. “They’ll tell you, ‘This is unlikely...’ but just hearing some

of those things, like not being able to have kids or losing my hearing, was overwhelming.”

Social Side Effects

Young adult patients make up about four percent of the overall cancer population, and this can bring its own challenges.

Young patients in particular can struggle with finding a place where they belong: people their age aren’t sick and are moving forward with their lives, while people who can relate or empathize can be decades older and in a different phase of life.

“It’s common for patients to experience grief about the illness itself, as well as seeing others moving on with their lives while they feel stuck in this one space,” said Paula Finestone, a clinical psychologist at Fox Chase.

Many young patients crave stability during a time that is foreign and unpredictable, said Beth Corcoran, a psychiatric-mental health nurse practitioner at Fox Chase. Some worry that friends and family won’t know how to interact with

“Young adults are a very healthy group and can typically tolerate treatment well. But they have decades of life to live, and the challenge becomes balancing efficacy with minimizing side effects.”

— DANIEL GEYNISMAN,
MEDICAL ONCOLOGIST





Lauren Ricottone at home with her children.

them anymore. “They just want normalcy in the midst of all these changes,” she said.

For Ricottone, the challenge was balancing a young family with chemotherapy appointments and recovery from surgery. Although their daughter was still a newborn, Ricottone and her husband needed to decide if they wanted more children in the future, as the chemotherapy could leave her infertile. They visited a specialist, but they decided to forgo fertility preservation.

Within months of her daughter’s birth, Ricottone was in early menopause as a result of the chemotherapy. She would sometimes go straight from a night shift as an emergency room nurse to an early morning chemotherapy appointment.

“I would sleep in the chemo chairs and then I would go home, try to spend time with the baby and then I would go back in for night work,” she said. “It was hard to balance work, the treatment and side effects, and being a mom.”

Shortly after her daughter’s first birthday, Ricottone wound up in the hospital with a stomach bug. There, she learned she was pregnant again, which was shocking, since she believed the chemotherapy had affected her fertility. After a second healthy pregnancy, she soon found herself juggling a newborn and cancer once again.

As a follow up to her chemotherapy, Ricottone had been getting periodic scans, but stopped during her pregnancy. A few weeks after her son was born, she had her first scan in several months and it showed that the cancer had spread to her lungs. She needed surgery quickly.

Her surgeon expected she would need almost a month of recovery at home. As two working parents to an active toddler and a newborn, the Ricottones leaned on their support system.

“Fortunately, my husband’s job gave him a month off so that he could care for me after my surgery, but we knew I would need round-the-clock care and someone to help with the kids,” she said. “We made up a schedule of shifts and our friends and family stepped in to help.”

She ended up recovering faster than anticipated and didn’t need chemotherapy again, which was a relief. Still, the ordeal was difficult.

“The one thing that stuck out the most was how much changed,” she said. “You’re told you have cancer, you need treatment and then you think you’re done. They don’t talk about all the other challenges you may face.”

Caring for the Caregivers

Sometimes, the person that needs the most support isn’t the patient. As he got ready for chemotherapy, Sankey was sure it was a bump in the road of life – a tough bump, but one he could get past. His biggest challenge was getting his parents to act as normal as he was.

“My mom especially was kind of a wreck. She’s a very happy person but you could see this was killing her,” he said.

Psychologists and social workers can help family members adjust to the shock of a diagnosis and support them while their loved ones are sick.

“As a parent, it’s your instinct to want to make them feel better when they’re sick,” Albanese said. “We can help them work through the emotions they’re feeling and find ways they can support their kids.”

Moving On

Less than a year after his diagnosis, Sankey is back where he likes to be: the lacrosse field. He celebrated finishing chemotherapy by ringing the celebratory bell at Fox Chase surrounded by 30 of his closest friends and family members. He’s back to coaching and has resumed his professional career in the Premier Lacrosse League.

Ricottone is still busy raising two active toddlers, and she has become an advocate, raising awareness about colorectal cancer and providing support for others facing the same challenges she did.

Seeing patients overcome the challenges cancer can bring gives providers great joy.

“It’s a privilege to take care of young adults,” Geynisman said. “I get to see them go on to get married, have kids, establish their careers. As a physician, most of my satisfaction comes from treating my patients well and seeing them thrive.” ♦

Rebuilding Through Rehab

A Specially Trained Team Gets Cancer Patients Moving Again

BY PAIGE ALLEN

PHOTOGRAPH BY CLINT BLOWERS

For years, Gloria Smith thought numbness in her arm and struggles with range of motion were the price of having survived breast cancer. They were side effects from life-saving surgery, so she endured the discomfort and inconvenience. After a hard fall in 2017 led her to the rehabilitation program at Fox Chase Cancer Center, she realized she didn't have to live with those side effects after all. They could be fixed.

"Up to 80 percent of cancer patients experience some sort of physical or psychological impairment after treatment, but only a fraction of those get referrals to programs like ours that can help them recover," said Jean Kozempel, manager of physical medicine and rehabilitation at Fox Chase. For more than 25 years she has been a leader in oncology rehab.

Radiation and chemotherapy can leave patients feeling fatigued or weakened and surgery can cause pain and other issues. Some of the most common side effects cancer patients face are fatigue, lymphedema, neuropathy, balance issues, and pain.

"The sooner we can treat these issues, the better, but we can still treat these problems years later," Kozempel said. "It's never too late to get in there and make a difference."

In rehab, Smith learned exercises that not only helped her recover from her fall but reversed the side effects from her surgery years before.

"I thought I just had to suck it up and be glad I was a

survivor," Smith said. "Physical therapy has made a tremendous difference in my life. It has transformed my life not only physically but emotionally as well."

After her mastectomy in 2001 and a second reconstruction surgery in 2008, Smith struggled to find an exercise program that worked for her new body. After a five-week session with a therapist at Fox Chase, Smith was back to her pre-cancer routine – something she never thought she could achieve. And Smith is far from alone in having trouble adapting to what her body could do.

"Your body is different after cancer and treatment and you might not be able to exercise the same way you did before," Kozempel said. "We can help patients find what's safe and effective for them to get them moving and feeling better."

At Fox Chase, a team of physical and occupational therapists work with patients from diagnosis to survivorship, and even some receiving hospice care. Patients undergo a full evaluation and the therapists develop an individualized plan designed to target the symptoms the patient is struggling with.

"Someone can need rehab for just a couple of weeks or sometimes it's a few months," Kozempel said. "The best way to ensure success is to work with patients about what is realistic for them."

Kozempel also runs a 12-week cancer fatigue program, where she brings in colleagues from other departments, such as nutrition services and psychology. The program allows patients to learn about the services available to them in a single setting. Each discipline can contribute to

"The sooner we can treat these issues, the better, but we can still treat these problems years later. It's never too late to get in there and make a difference."

— JEAN KOZEMPEL,
MANAGER OF PHYSICAL MEDICINE
AND REHABILITATION AT
FOX CHASE CANCER CENTER



improving quality of life for cancer patients.

“We know the medications they are on, the procedures they’ve had, and the effects of radiation treatment,” she said. “Cancer patients and survivors have specific needs and everyone on our team has the specialized training to work with this population. We know the best techniques to help our patients reach their goals and push them to be

better without pushing them too far.”

Kozempel knows how important these services can be in cancer care, so she has become a leader in training new specialists and developing national guidelines. But seeing individual patient successes is just as important.

“It has done wonders for my body and my spirit,” said Smith. “I feel 30 years younger, and that is truly a gift.” ♦

The Menu of Complementary Care

Comprehensive Therapy for a Complex Disease

BY PAIGE ALLEN

PHOTOGRAPH BY CLINT BLOWERS

Cancer can wreak havoc on relationships, finances, and emotions, as well as the body. Treating it requires a holistic approach. Just as important as removing the cancer is managing the pain that can come with it. Just as vital as therapy is the patient's comfort and quality of life.

Comprehensive cancer centers like Fox Chase Cancer Center provide patients a host of services to not only treat the cancer but the person facing the disease.

SPEECH PATHOLOGY

Treatment for certain cancers can impair how people breathe, communicate, and eat. Speech pathologists at Fox Chase help patients maintain as much normalcy as possible before, during, and after treatment.

Patients with head and neck cancer may have difficulty swallowing, experience vocal cord paralysis, or need to learn to speak with the assistance of a prosthesis.

Sometimes, the tumor itself can be the cause of these impairments, said Barbara Ebersole, director of speech pathology at Fox Chase. Speech pathologists are an integral part of the care team, often meeting head and neck cancer patients at their first appointments. Many patients begin therapeutic exercises at this point – known as “prehab.” Prehab is a way of mitigating the effects of treatment on swallowing function. From the first days, they also counsel patients on what to expect in the long and short term.

“As specialists our job is to not only help patients return to normal communication and swallowing function, but to also provide information, counseling, and support along the recovery process,” Ebersole said.

PALLIATIVE CARE

The Pain and Palliative Care Program aims to support the best possible quality of life for patients and their families.

One of the greatest misconceptions about palliative care is that pursuing this type of care excludes patients from active treatment, said Molly Collins, director of medical education for the Pain and Palliative Care Program at Fox Chase. In fact, it is a fundamental component of cancer care and can be integrated with treatment at any stage of disease.

“We work hard to try to improve symptoms, which we hope can help patients pursue aggressive care. We also talk to our patients about how to prepare for the future with their illness, even if things may not go as we are all hoping. We talk about a plan A and a plan B. We really want plan A to work, but will still support you on plan B, too,” she said.

SOCIAL WORK SERVICES

Treatment can be physically and emotionally exhausting.

“Cancer makes you think about everything, all the little stuff we often take for granted,” said Anjali Albanese, a social worker at Fox Chase. “You grieve the loss of yourself and your relationships. Your identity has changed.”

Albanese and other social workers at Fox Chase help guide patients and their families through their cancer experience. They provide supportive counseling to assist patients and their support system in dealing with the emotional distress that can be caused by their cancer diagnosis. The social work team remains with the patients throughout the treatment process. They can also provide information about advance directives, hospice, family leave, disability benefits, and cancer-related support programs.

“We help patients with every aspect of their life that is changed by cancer, whether that's their employment, their family dynamic, their emotional well-being or their support system,” said Mark Itzen, a social worker at Fox Chase.

NUTRITION COUNSELING

Meeting nutritional needs is challenging for some patients. Patients can experience loss of appetite or mouth



sores, and some surgeries can make it difficult for patients to eat normally.

“Weight loss can lead to muscle mass loss and treatment interruptions, so it’s important for patients to maintain their weight during treatment,” said Tara Mauro, a registered dietitian at Fox Chase.

Nutritionists are available to help survivors maintain a healthy diet. The team at Fox Chase offers assessments and can evaluate patients for feeding tubes and other alternative feeding options.

PSYCHO-ONCOLOGY SERVICES

The multidisciplinary team consists of psychiatrists,

psychologists, and a nurse practitioner with expertise in evaluating and treating the emotional and cognitive challenges that can come with cancer, from time of diagnosis to treatment and recovery. Treatment modalities include evidence-based cognitive behavioral therapy, mindfulness meditation, as well as medication management.

“The psycho-oncology division works in close collaboration with the patient’s team of providers, including oncology and surgery, as well as the social work department and pain and palliative care team, to help address patient mental and emotional well-being, quality of life, and family needs,” said Emmie Chen, director of the section of psychiatry at Fox Chase. ♦

RECOVERING WHAT WAS LOST

BY ANDREW BECKER

Adventure and service have always been important themes in Tom Maguire's life. His family loves to travel, go camping, volunteer, and especially go diving.

"We got into scuba diving many years ago when our oldest daughter asked if she could try skydiving. I thought scuba diving was the safer choice," he said.

Tom has two daughters and a son, all adults now. As they grew up, Tom and his wife Erin emphasized community service, and frequently volunteered alongside the children.

"If the kids wanted to borrow the car, we'd usually ask if they had volunteered that week," Maguire said.

In his teens, their son became a recovery diver with the Garden State Underwater Recovery Unit, combining the family's interests in volunteering and diving. He and Tom have since spent almost a decade helping to recover drowning victims and lost property, and coordinating with law enforcement to assist during water-related emergencies.

"We still go on diving trips for fun, too," he said.

In 2018, Tom was diagnosed with bladder cancer, and even at a moment when it seemed his

diving days might be over, he found a way to give back.

At age 63, having had no symptoms or concerns about his health, he noticed blood in his urine. Within a short time, the blood became heavier and he made an appointment with his long-time primary doctor. She prescribed medicine for a urinary tract infection, which seemed to work. For two weeks there was no bleeding. When the blood returned, Tom went back to the doctor, who sent him to a urologist.

"A big part of my life is returning lost items and lost people. Fox Chase returned a part of me I assumed had been lost."

— TOM MAGUIRE, BLADDER CANCER SURVIVOR

The urologist diagnosed him with bladder cancer, and found that it had infiltrated the lining of his bladder, meaning it was muscle invasive. Knowing that Tom needed comprehensive treatment, the urologist sent him to Alexander Kutikov, who leads the urologic surgery team at Fox Chase Cancer Center.

"I asked the doctor who he would

choose to be his own doctor, and he said Dr. Kutikov," Maguire said.

Tom lost his father to lung cancer in the 1970s. It had spread widely by the time it was discovered, and he died soon after his diagnosis. Initially Tom assumed he would have a similar fate. But in addition to decades of medical advances, he benefitted from extra motivation. His oldest daughter was pregnant with her second child—Tom's second grandchild.

"I was diagnosed in April and all I wanted was to live until July,

when the baby would be born."

While Dr. Kutikov was confident he could treat Tom, there was a catch. Treatment for muscle-invasive bladder cancer usually involves chemotherapy followed by cystectomy – surgery to remove the entire bladder. The patient then decides between two life-altering options to replace the bladder: an external pouch or a



neobladder created from a portion of intestine. Tom understood that he would survive, but that whatever he chose would make future dives difficult, if not impossible.

“As upset as I was about having cancer, diving had been such an important, not to mention fun, part of my life for so long. It felt like adding insult to injury,” he said.

As he planned Tom’s chemotherapy regimen, medical oncologist Matthew Zibelman offered an option that could also help others diagnosed after him. He told Tom about the RETAIN bladder clinical trial led by his colleague Daniel Geynisman.

“Up to 30 percent of muscle-invasive bladder cancer

patients might be able to keep their bladders after chemotherapy,” Zibelman said. “This trial is seeking a way to identify which patients can safely avoid surgery.”

Tom’s treatment started as planned, with three rounds of chemotherapy, but the doctors also tested his tumor for certain biomarkers and genetic mutations that would show whether or not chemotherapy alone could effectively kill the cancer. On the morning of Tom’s third and final chemotherapy infusion, he learned that he had the required biomarkers, so he would likely keep his bladder.

“Although that third chemo treatment left me feeling very tired and worn out, I was

overwhelmingly happy about the trial news,” he said.

A month later, scans showed that Tom was cancer free. His follow up care requires a full exam at Fox Chase every three months for five years, including blood tests and a cystoscopy. But he says the discomfort of the test is a small price to pay for what he calls his second life.

His active life resumed as soon as he felt well. Tom and Erin have been camping, kayaking, diving, and spending time with their grandson and the granddaughter he wasn’t sure he would meet.

“A big part of my life is returning lost items and lost people,” he said. “Fox Chase returned a part of me I assumed had been lost.”

OUTRUNNING RESISTANCE

BY PAIGE ALLEN

Feet pounding the pavement, Lori Rink thinks about the day ahead of her. The quiet serenity of Bucks County, where deer flit down quiet streets and ravage vegetable gardens, provides a peaceful counterbalance to her hectic schedule.

Rink is already thinking about all that she will do today. There are grants to write, trainees to mentor, experiments to run. And when she gets home, there will be homework that needs to be finished and kids that need to be fed. And when the kids are asleep, Rink will pull out her laptop and review grant applications.

The days are busy and so are the nights.

But the mornings? Those are hers. And so, she runs.

Rink is an assistant professor in the molecular therapeutics program at Fox Chase Cancer Center. She studies a rare cancer called gastrointestinal stromal tumor (GIST) and Gleevec, the one drug that seems to work for these patients.

For a long time, surgery was the only option for patients with this rare cancer that affects fewer than 6,000 people in the United States each year. In 2002, when Rink was still at the start of her journey

to becoming a scientist, things changed when the Food and Drug Administration approved Gleevec. Around 85 percent of GIST harbors a mutation in a gene called KIT, which drives the tumors. Gleevec works by targeting this gene. For many, the drug has been life-changing and life-saving. But for most patients, the drug even-

identified genetic markers that could predict how a patient will respond to the drug. Margaret von Mehren, director of the sarcoma program at Fox Chase, has developed clinical trials based on this research.

Collaborations like this, which help translate bench discoveries into patient care, are one of the

“I have been fortunate to have great mentors throughout my training and still today. Taking what I’ve learned and been given and passing it on is so important.”

— LORI RINK, ASSISTANT PROFESSOR, MOLECULAR THERAPEUTICS, FOX CHASE CANCER CENTER

tually stops working, leaving them with no other treatment options. Rink wants to change that.

“There’s no question that Gleevec revolutionized GIST therapy,” she said. “But over time, patients can develop resistance to it, reducing its effectiveness.”

In the lab, Rink and her group are trying to understand what causes eventual drug resistance in GIST patients. So far, they have

reasons Rink loves Fox Chase. Another thing she appreciates is the opportunity to work on one of the first drugs that targets a genetic mutation in the institution where the Philadelphia Chromosome was discovered. That 1959 discovery led to the understanding that genetic mutations could cause cancer.

“This drug is what led me to where I am. It was approved 17



Lori Rink

years ago but it's still the frontline treatment option," she said. "It was the start of small molecule inhibitors and drugs aimed at targeting specific cells and specific mutations. This has changed the treatment paradigm for all cancers, not just the ones I study."

Growing up in Scranton, Rink loved learning, asking questions, and tackling the toughest problems. She earned her PhD in molecular biology from Temple University and completed her postdoctoral training at Fox Chase. Along the way, she married her high school sweetheart and started a family.

Her passion for learning has taken her around the country and the globe. She often attends rallies

and lobbying days for medical research in the nation's capital. "I want to make sure politicians don't forget about cancer patients and the importance of funding cancer research." She recently travelled to Italy for a conference, where she enjoyed the breathtaking sights of Rome almost as much as the science being presented.

At home, Rink and her husband are knee-deep in raising three kids under the age of 12. They each have busy careers but lean on one another to find success balancing work and a busy home life. Weekends are family time, packed with soccer games and play dates and trips to the beach in the summer. At work, Rink is organized and focused, with an emphasis not

only on advancing cancer research but also on the importance of training the next generation of scientists.

"I have been fortunate to have great mentors throughout my training and still today. They've guided me in the science but also helped me chart a path where I can balance being a scientist with the things I love to do outside the lab," she said. "Taking what I've learned and been given and passing it on is so important."

Rink's career is centered on high-stakes questions where lives are in the balance, and she has devoted her life to helping others. But in the mornings, on the quiet streets of Bucks County, this is her time. And she just runs.

HOW ONE MAN'S LEGACY HELPED ANOTHER SURVIVE

Two years after his passing, Brent Evans is still paying it forward

BY LISA BROIDA BAILEY

In 2010, a young snowboarder named Brent P. Evans was diagnosed with Stage 4 non-Hodgkin lymphoma. During his treatment, he envisioned an epic snowboarding event that would raise funds to end cancer. Two years later, he held his first extreme sports fundraiser, and by 2016, his dream had evolved into Carve 4 Cancer, a nonprofit supporting blood cancer research and patient care. Brent died from a cancer-related complication in 2017, but his legacy continues to help others.

Determined to keep Brent's mission alive, his friends and family created a spin-off, the Live Like Brent Foundation, to offset expenses for blood cancer patients. Their hope is to enable others to focus on living life to the fullest by relieving some of the financial strain associated with prolonged illness.

Woodworker John Farrar and his wife Jenn, a new oncology nurse, were living in Northeast Pennsylvania, raising their two daughters when they were suddenly faced with the challenge to live like Brent.

One morning John found that he could barely get out of bed. He described his symptoms as "the worst flu you ever had." John's doctor ordered a bone marrow



biopsy, which revealed that he had mantle cell lymphoma, a rare type of non-Hodgkin lymphoma.

Jenn looked to her practice for a recommendation, and John was

referred to the Fox Chase-Temple University Hospital Bone Marrow Transplant (BMT) Program in Philadelphia, a two-hour ride from their home near Scranton.



“It was such a great feeling when I told them I had an answer to their prayers. Like John, Brent faced cancer twice. He would want to know that these funds were helping a fellow patient.”

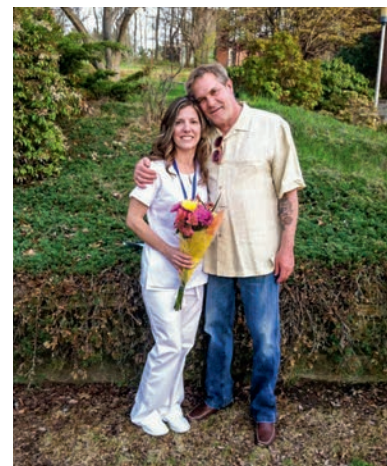
– LINDA FELDMAN, SOCIAL WORKER, FOX CHASE-TEMPLE UNIVERSITY HOSPITAL BONE MARROW TRANSPLANT PROGRAM

Relying on family and friends to help with their children, Jenn dropped everything to ensure her husband had access to the best treatment available.

Over the next few years, John underwent two stem-cell transplants and a six-week stint in the ICU in a medically-induced coma. After waking from the coma, John’s muscle memory was gone. He felt paralyzed. “I couldn’t walk, couldn’t move my finger, nothing. I was devastated,” said John. Since he had used all of the rehabilitation days allotted by his insurance provider, his transfer to a premier rehabilitation hospital that specializes in complex cases was denied.

At this point, Jenn was working part-time and John wasn’t able to work at all. They could not afford inpatient rehab out-of-pocket. However, they knew it was John’s only chance of regaining mobility and returning to his life. Seemingly out of options, the Farrars turned to Linda Feldman, a social worker in the Fox Chase-Temple BMT Program, who had the answer.

Live Like Brent had recently awarded a grant to Fox Chase, and Linda was able to access the funds for John. “It was such a great feeling when I told them I had an answer to their prayers. Like John, Brent faced cancer twice. He would want to know that



Opposite: Jenn and John’s wedding
Top left: Family beach vacation in 2013
Top right: Jenn and John in Mexico, 2017
Bottom: Jenn’s graduation from nursing school

these funds were helping a fellow patient,” she said.

Support from Live Like Brent changed John’s life. After several weeks at the rehab facility, he was able to relearn his daily living activities and build his strength back up. Today, he is walking unassisted and able to travel back and forth to Fox Chase for treatment. Most importantly, he is able to be at home with his family.

“Words cannot adequately express the gratitude I have for Carve 4 Cancer and Live Like Brent,” said John. “My family thought I was going to die in that ICU. They never expected me to survive – and thrive. And I’m doing that because of Brent’s vision.”

REMEMBERING CAROLANNE WISMER

In November 2018, Fox Chase Cancer Center lost one of its own in longtime nurse Carolanne Wismer, who spent 30 years caring for patients in the infusion room. She was diagnosed with Stage 4 lung cancer in March 2017.

She brought the same attitude to her cancer treatment at Fox Chase that she did to caring for her patients. As documented in a short film about Wismer by one of her daughters' friends, she did her best to stay positive and have fun despite her cancer. She put her family ahead of herself, just as she did for every patient and family she treated over the years.

Wismer was the beloved wife of William for 28 years and mother of four daughters: Samantha, Colleen, Madison, and Caroline, who is



William and Carolanne Wismer and their four daughters



Carolanne Wismer

following her mother into a career as a nurse. Caroline is currently a medical assistant in the infusion room at Fox Chase and is in nursing school at La Salle University. Wismer is also survived by her siblings, Joanne Linus, Susie O'Connell, Betty Piccolo, Dianne Coyle, Joseph Macy, and Marianne Brakoniecki, and was preceded in death by her brother Steven and her sister Sandy Ward. Susie and Marianne are also longtime Fox Chase nurses.

A funeral was held on November 24, 2018. Wismer was 54.

IN VINO VITA HELPS ACCELERATE NEW TREATMENTS

On Saturday, April 6, 2019, more than 500 generous supporters of Fox Chase came together for the sixth annual *In Vino Vita* benefit and wine auction at Vie in Philadelphia. The event raised \$1.2 million in support of this year's special pledge, translational research. Event chairs Margot and Robert Keith led the way with a gift of \$100,000 that was matched by two other donors. Louis and Carol Ann Della Penna served as wine chairs.

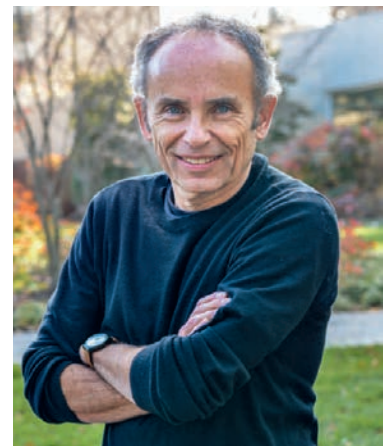
Translational research bridges the gap between the lab and the clinic. Support from this event will help advance the speed at which research makes a positive impact on patient care. Previous special pledges have provided funding for new diagnostic technology, early stage research, and a new immunotherapy laboratory.

CHRISTOPH SEEGER RECEIVES BLUMBERG PRIZE

Christoph Seeger, a professor and senior scientist at Fox Chase Cancer Center, is the recipient of the Hepatitis B Foundation's 2019 Baruch S. Blumberg Prize for excellence in hepatitis B research.

"Dr. Seeger's outstanding contributions to hepatitis B molecular biology have had implications not only for hepatitis B, but for all viruses," said Timothy Block, PhD, president of the Hepatitis B Foundation and its Baruch S. Blumberg Institute. "We are proud to recognize the impact of his work in hepatitis B research."

The Baruch S. Blumberg Prize is the Hepatitis B Foundation's highest honor, given to publicly recognize and appreciate the outstanding contributions made by an individual to significantly advance the science and medicine of hepatitis B. It is named for Baruch S. Blumberg, who received the Nobel Prize for his discovery of the hepatitis B virus and development of a preventive vaccine, and who was instrumental to the work of the Hepatitis B Foundation. Blumberg's remarkable career included 25 years at Fox Chase.



Christoph Seeger

MICHAEL HALL NAMED CHAIR OF THE DEPARTMENT OF CLINICAL GENETICS

Michael Hall has been named chair of the Department of Clinical Genetics at Fox Chase Cancer Center. As both an oncologist and a clinical cancer geneticist, Dr. Hall brings a valuable combination of experience to the department. His research and clinical work focus on cancers of the gastrointestinal tract, with particular interest in colorectal, pancreatic, and small bowel cancers. In addition, he has specialized expertise in risk assessment for gastrointestinal, endocrine, and genitourinary cancers. He sees a variety of patients, including young people who tend to have hereditary cancers, and approaches

As chair, Dr. Hall will build on the legacy of his predecessor Mary Daly, the founding director of Fox Chase's Risk Assessment Program, while seeking to cultivate new initiatives and promote the development of the faculty and staff.

each case with a great appreciation for the unique diagnosis and needs of the patient.

As chair, Dr. Hall will build on the legacy of his predecessor Mary Daly, the founding director of Fox Chase's Risk Assessment Program, while seeking to cultivate new initiatives and promote the development of the faculty and staff.

Dr. Daly will continue to treat patients and conduct research as



Michael Hall

a professor in the Department of Clinical Genetics.

"Dr. Hall has served our institution in an outstanding fashion for a number of years. Recognized among America's Top Doctors by *Castle Connolly* and our region's Top Doctors by *Philadelphia* magazine, he is well-regarded by professional peers and patients alike," said Richard I. Fisher, MD, president & CEO of Fox Chase.

Dr. Hall will also continue to serve in his other roles at Fox Chase, including director of Gastrointestinal Risk Assessment and NCCN Genetic Colorectal/Colorectal Cancer Screening Panel member.

The Department of Clinical Genetics offers a comprehensive cancer risk assessment service, combining the strengths of risk education and genetic testing with individualized options for prevention. It was one of the first in the nation to offer comprehensive services aimed at personalizing cancer risk estimation, prevention, and early diagnosis.

The following investigators earned the second round of Fox Chase's pilot project grants. Grants are supported in large part by the generosity of donors attending the *In Vino Vita* Benefit & Wine Auction, along with funding from the NCI Cancer Center Support Grant. The funds support cutting-edge projects with high potential of leading to significant peer-reviewed funding; that address community needs; and/or translate laboratory findings into new clinical treatments. The grants provide funding of \$75,000 per year for two years.



Igor Astsaturov, MD, PhD, for his proposal, "Metabolically-driven heterogeneity of pancreatic cancer populations at a single cell level resolution"



Ekaterina Koltsova, MD, PhD, for her proposal, "The role of IL27R signaling in the control of NK cell mediated anti-tumor immunity in liver cancer"



Jeffrey Peterson, PhD, for his proposal, "Eliminating metastatic triple negative breast cancer through ferroptosis"



Stephen Sykes, PhD, for his proposal, "FOXOs regulate poly-unsaturated fatty acid metabolism to selectively support acute myeloid leukemia"



Raza Zaidi, PhD, of the Fels Institute for Cancer Research and Molecular Biology at the Lewis Katz School of Medicine, for his proposal, "Novel functions of CTLA4 in melanoma"

ALFRED KNUDSON'S THEORY OF EVERYTHING

BY NIGEL THOMPSON

In 1971 Alfred Knudson developed a hypothesis that would ultimately answer how, if not why, people get many types of cancer.

Knudson, who spent 40 years as a leading researcher at Fox Chase Cancer Center, introduced the idea of inherited cancer genes, as well as the notion that normal genes could be damaged by a variety of exposures. His work also predicted the existence of what are now known as tumor suppressor genes, a major breakthrough in the development of new cancer therapies.

“The way we think about cancer now has really been framed by the way he described it back in the early ’70s,” said Jonathan Chernoff, chief scientific officer at Fox Chase.

The “two-hit” theory began with a study of retinoblastoma, a rare eye cancer, in newborns and infants. A pediatrician by training, Knudson thought that babies must have far fewer potential external causes for cancer. He observed that newborns born with the disease usually had a severe case that affected both eyes, while cases that occurred later in infancy usually only affected one eye.

Everybody inherits half of their genes from each parent, and he hypothesized that mutations in both copies of a given gene could lead to cancer. He found that the babies born with retinoblastoma inherited one mutated gene from

one parent, leaving them with only one good copy of the gene, while children diagnosed later were born with two good copies of the gene. Thus, the heritable cases needed only one mutational “hit.”

“He was thinking about this the way a mathematician or physicist or statistician might,” Chernoff said.

Knudson joined the Fox Chase scientific advisory committee in 1970 and joined the faculty in 1976. He served in a variety of leadership roles over the decades, including Center president and chief scientific officer.

“The way we think about cancer now has really been framed by the way he described it back in the early ’70s.”

— JONATHAN CHERNOFF, CHIEF SCIENTIFIC OFFICER AT FOX CHASE CANCER CENTER

His support for colleagues was renowned. It played a key role in at least one landmark success. In the late 1970s, Knudson secured \$50,000 to continue Irwin “Ernie” Rose’s work with visiting scientists Avram Hershko and Aaron Ciechanover. The project, which investigated how cells dispose of unwanted proteins, was far from Knudson’s expertise.

“He just figured if something in science was interesting enough, it would probably be important too, and he’s been proven right many

times,” Chernoff said.

He was right about that project, which won Rose, Hershko, and Ciechanover the Nobel Prize in Chemistry in 2004. He was also right about the two-hit theory, which was confirmed in 1986 with the cloning of the retinoblastoma gene. It led to the understanding of errors in the genetic code as a cause of cancer.

Knudson died in 2016 at age 93. Throughout his long career his contributions were honored with major awards, including the American Cancer Society

Medal of Honor, the Canada Gairdner International Award, the Albert Lasker Award for Clinical Medical Research, the Distinguished Career Award from the American Society of Pediatric Hematology/Oncology, the Kyoto Prize, and the American Association for Cancer Research Lifetime Achievement Award. Knudson was elected a member of the National Academy of Sciences in 1992.

“It’s hard to overstate his impact,” Chernoff said.



Knudson explaining his two-hit theory



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