

BreakThroughs

SPRING 2018



Duke Cancer Institute

Stealing Time From Prostate Cancer

JOINING FORCES

Duke's New Prostate and Urologic Cancer Center

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Help Us Find More Answers



MICHAEL KASTAN

JARED LAZARUS

ON THE COVER:

STEALING TIME FROM PROSTATE CANCER.

James "Jimmy" Barnes of Durham, North Carolina, has fought prostate cancer for more than 24 years, the last 10 of them at Duke, with the help of Andrew Armstrong, MD. Barnes works with his church community to advocate for prostate cancer screening and awareness. Read more on page 4.

Ten years, twelve years, even more than two decades. That is how long some of Duke Cancer Institute's patients with prostate and other urologic cancers are living past their diagnoses, thanks to a new generation of therapies and our physician-scientists' willingness to leave no avenue unpursued.

Translating those gained years into a complete cure will require taking the road less traveled—pursuing clinical studies and treatment options that may seem like a long shot. That is what Dan George, MD, and the clinicians and scientists who make up Duke's new Prostate and Urologic Cancer Center do every day. The new center is organized along the same model as Duke Cancer Institute (DCI)—integrating clinical research and care into one unit, so discoveries in the lab can quickly translate to the clinic.

Providing cancer care as it should be includes keeping the whole person healthy. As scientists increasingly realize that cancer can go hand-in-hand with heart disease, a group of oncologists and

cardiologists at Duke are delving into the emerging research field of cardio-oncology. You'll also learn in this issue about emerging efforts to make sure the patient voice and

"Every day we are rewriting the statistics and finding the answers to defeating cancer."

Michael B. Kastan, MD, PhD

experience are given more weight as we develop new therapies and make treatment decisions.

At DCI, every day we are rewriting the statistics and finding the answers to defeating cancer. With you on our side, we can find even more of them. Please join us.



Michael B. Kastan, MD, PhD
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Breakthroughs is produced two times a year by Duke Cancer Institute Office of Development
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Durham NC, 27701 • Phone: 919-385-3120

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The Toxic Cost of Cancer

Fumiko Chino, MD, a resident in radiation oncology, last summer co-authored research showing that the high cost of cancer care is a serious problem for many patients.

But for Chino, this problem—"financial toxicity"—is more than just academic.

In 2005, she was engaged to be married and was working in her dream job as an art director for a video animation company when her fiancé, Andrew Ladd, a doctoral student in robotics at Rice University, was diagnosed with neuroendocrine carcinoma, a rare cancer of the endocrine (hormonal) system cells. It quickly became clear that his student health insurance, with a \$500,000 lifetime limit, was not going to come close to covering his medical bills.

"We were in our twenties, and it had never occurred to us that it might not be good insurance," Chino says.

Ladd soon maximized his pharmacy benefits, and he and Chino had to start paying out of pocket—thousands of dollars per month—for prescription drugs that he needed daily. Chino cashed out her retirement fund. Their parents helped as much as they were able.

"We borrowed money, and we were able to pay for the medications by hook or by crook," Chino says.

In spite of the struggles and an uncertain future, they got married as planned, and then moved in with Chino's parents in Indiana. "We bankrupted ourselves and relied heavily on our families," she says.

Despite their efforts, it was impossible to keep up. Hundreds of thousands of dollars in bills accumulated. Debt collectors began to call. "It was like a dark cloud hanging over us," says Chino.

In the end, the treatments those bills reflected weren't able to turn back his cancer. On March 4, 2007, Ladd died.

Her husband's death redirected

Chino's life. Leaving video production behind and instead setting her sights on working for positive changes in health care, she enrolled at Duke University School of Medicine.

Chino initially intended to study geriatrics. Then she heard Yousuf Zafar, MD, a medical oncologist at Duke Cancer Institute and an associate professor of medicine, give a talk about financial toxicity—the effects of health care costs on cancer patients' quality of life and care. She and Ladd had lived the very scenario Zafar described.

"It was a light bulb moment for me," she says. "I knew that I'll be passionate about cancer care and that I can actually make a change."

Last summer, Chino and Zafar published a study in *JAMA Oncology* indicating that more than a third of insured cancer patients pay more out-of-pocket than they expected, despite having health coverage. Costs such as copayments and deductibles can lead to financial distress among patients, even those with insurance, of all income levels. On average, Chino and Zafar found, cancer patients spend 11 percent of their income on

More than **1/3** of insured cancer patients pay more out-of-pocket than they expected.

Some cancer patients spend **11%** of their income on out-of-pocket health care costs

And some spend as much as

1/3 of their total household income



SHAWN ROCCO

Motivated by her late husband's cancer journey, **FUMIKO CHINO** studies the high cost of cancer care.

out-of-pocket health care costs, and some spend as much as one-third of their total household income.

That often forces difficult decisions, sometimes with serious medical consequences. Chino has seen patients who abandon or skip medications and treatments because they cannot afford them. "I had a patient who told me, 'I'm not willing to bankrupt my family for this,'" she says.

Chino says one part of the solution is to make conversations about costs a routine part of patient care. She talks with her own patients about the costs of treatment, and if she knows that they cannot afford a particular medication, she might be able to prescribe a cheaper one that won't compromise their treatment.

"If you don't think about the whole picture for cancer patients, you are missing out the best way of treating them," she says. "We have all these great technologies and medicines like immunotherapy, radiation, and other techniques to target tumors, but all of that could fall apart if patients can't afford the gas to come to their treatment."

By Aliza Inbari

d

DAN GEORGE, MD, remembers one of the first times he helped someone live longer. He was treating a patient with metastatic kidney cancer who enrolled in a clinical trial of a new drug and was one of the first people in the United States to receive it.

“He could only tolerate the drug for about three weeks; then he was too sick to take it any longer,” says George, professor of medicine and surgery and director of genitourinary oncology at Duke Cancer Institute. “At four weeks we did the imaging, and his tumors had completely gone silent.” In other words, they had no blood supply.

“He was going to die in a matter of weeks, and we gave him an extra year to live. It was incredibly powerful to do that for someone.”

Dan George

“He was going to die in a matter of weeks, and we gave him an extra year to live. It was incredibly powerful to do that for someone,” George says. “But it was also frustrating, because I wanted to do better. I wanted to do more.”

That experience and countless others like it in George’s 20 year career are what drive him at Duke to pursue the clinical research studies that no one else will, and to push for treatment options when others may say there is nothing left.

BY ANGELA SPIVEY

This drive to steal time back from cancer, held by all of George’s colleagues at



the newly launched Duke Prostate and Urologic Cancer Center, which George directs, means that some patients have formed relationships of a decade or more with their doctors. It also means that many of those patients and their families have been inspired to give back.

DURHAM RESIDENT SAM POLEY

says that shortly after he met George, he felt inspired to help him. George treated Poley’s father, Neil, for prostate cancer, which he battled at the same time as congestive heart failure. “He always addressed my dad not as a patient, but as a human being. When my dad would be hospitalized for heart issues, Dan would go see him,” Poley says.

Poley found his chance to help George when he learned about a clinical trial that George wanted to pursue. Based on research conducted in the lab of Donald McDonnell, PhD, chair of the Department of Pharmacology and Cancer Biology, the

Brant Inman, Dan George, and Andrew Armstrong

James “Jimmy” Barnes



TK Wetherell



Neil Poley

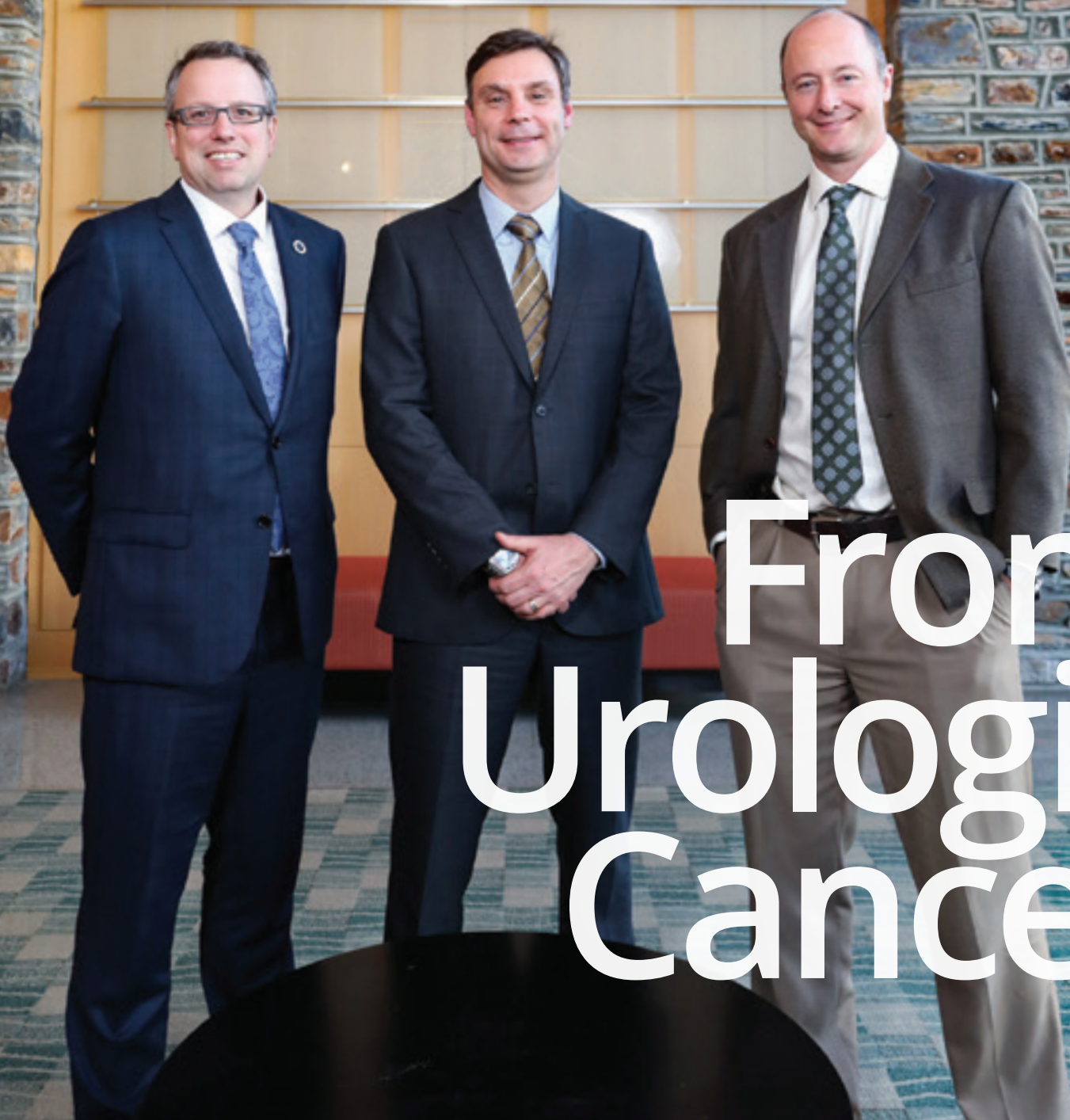


THE DUKE CANCER INSTITUTE



DUKE CANCER INSTITUTE RESEARCH LABORATORIES
ENSURING THE FUTURE OF GROUND-BREAKING RESEARCH
FOR THE ADVANCEMENT OF CANCER PREVENTION AND CARE

Stealing Time



From Urologic Cancer

idea for the trial was simple. Prostate cancer cells soak up copper. In the lab, if scientists give the cancer cells all the copper they want, then treat with a copper-chelating drug, the drug seeks the cancer cells out and kills them. It so happens that a copper chelator called disulfiram is already approved for treatment of alcoholism. George wanted to try disulfiram in patients with advanced prostate cancer. But most pharmaceutical companies weren't interested. Disulfiram is an old drug, and there's not much profit in developing it for a new use.

A marketing professional, Poley launched a fundraising campaign, Give1forDad, in 2015, shortly before his father died. "It became clear that my Dad wouldn't benefit from this treatment, but if it could help someone else, I knew he would want that," he says. By early 2016, Poley's campaign had raised enough to enroll the first patient in the copper trial. Poley has kept right on raising funds. He encourages other people affected by prostate cancer to share their stories on his website, give1fordad.com.

The copper trial as well as other research has benefited from another patient of George's who knows a bit

about fundraising because of his profession TK Wetherell, PhD, former president of Florida State University. Wetherell was treated for prostate cancer at MD Anderson Cancer Center for a while, but he came to Duke for the focus on the individual patient. "Everyplace else, it seems like they're always telling you why they can't do something," Wetherell says. "Dan will say 'That may work,' and 'Let's try this, that, and the other.' It's just personalized at Duke."

Wetherell and friends organized a dinner and auction in Florida, and donated the proceeds to the Jimmy V Foundation, which matched them. The foundation gave George grants to support the copper trial as well as a small trial for prostate cancer patients of a modified poliovirus treatment that has produced dramatic results for some brain tumor patients.

It took support from Poley and Wetherell, as well as the Peter Michael Foundation and a small biotech startup called Cantex Pharmaceuticals to get the copper trial to its current point of having enrolled five patients. "This is a study that would never happen if we didn't drive it. To me that is ultimately the

"Dan will say 'That may work,' and 'Let's try this, that, and the other.' It's just personalized at Duke."

TK Wetherell



research that we want to be able to do at Duke—the studies that no one else can or would do," George says.

There's no guarantee that either of these treatments will work for prostate cancer. But what's important to George's supporters is the pursuit of all available avenues. "That's what I like about Duke; they look for ways to try and figure this thing out," Wetherell says.

24 YEARS AND COUNTING

The large number of options for advanced prostate cancer is what drew James "Jimmy" Barnes to Duke, after having been treated at UNC-Chapel Hill for more than a decade. When Barnes first met Andrew Armstrong, MD, MSc, he told Armstrong that one of his goals was to see his first grandchild born. Barnes' granddaughter, Anika, is now 10 years old. Barnes has also gotten to know his second grandchild, a boy named Sage; he's 5.

Barnes, an easy-going retired pharmacist who in 1969 was the first African American male to graduate from UNC-Chapel Hill's School of Pharmacy, says that he can relate to Armstrong, an associate professor of medicine, on many levels. They can talk about science and new

Fast Facts

THE DUKE PROSTATE AND UROLOGIC CANCER CENTER

- The center formally launched in April 2018 to unite all the clinicians, researchers, and staff at Duke working to accelerate research

discoveries into the clinic, promote practice-changing research, and develop promising talent in the prostate and urologic cancer fields.

- Duke's multidisciplinary team treats more than 1,500 patients per year with prostate cancer and other urologic cancers.
- Director of the center is Dan George, MD, professor of medicine and

surgery and director of genitourinary oncology at Duke Cancer Institute.

- Associate directors of the center are Andrew J. Armstrong, MD, MSc, associate professor of medicine, and Brant A. Inman, MD, MS, the Cary N. Robertson Associate Professor of Urologic Oncology and vice chief of urology.

treatments, and they can talk about sports; Armstrong is a runner and soccer player, and Barnes played tennis until he was 65.

Like many African American men, Barnes was struck by prostate cancer young, at just age 47. He wants to keep that from happening to others. A deacon at Union Baptist Church, one of the largest African American churches in Durham, Barnes serves on the church's cancer support committee. He arranged for Armstrong to speak at the church's prostate cancer symposium, about new treatments on the horizon and the importance of screening. "Prostate cancer impacts so negatively on African American men," Barnes says. "I want my community members to get in to be seen. You need to understand your family history so you can provide it to health care personnel. And understand how your lifestyle can affect your risk."

Barnes has taken a succession of treatments that have helped reduce pain and increase his mobility. "Dr. Armstrong has kept right on working and putting the options out there," Barnes says. "He never presented himself as someone who could work miracles. But he said, 'I will do the best I can.'" Barnes walks with a cane now but says that the more physically active he is, the better he does. "Life changes, but I still have a good life," he says. "When I was first diagnosed, I didn't think I would live to be 70."

LIQUID BIOPSIES

One of the treatments that Barnes has tried is radium-223, which he received through a clinical trial that Armstrong leads to understand why the treatment works. As part of the trial, Barnes and other patients had a "liquid biopsy"—a simple blood test that mea-



sures levels and characteristics of tumor cells circulating in the blood.

"The circulating tumor cells are like little metastases," Armstrong says. "They are individual cells that are actively spreading in the blood." In the research setting, Armstrong uses these cells to track the severity and biology of prostate cancer and to predict which patients will respond to which treatments. In a study of patients with advanced pros-

JOIN THE FIGHT

You can help find the answers to defeating prostate cancer and other urologic cancers. To learn how to get involved or make a gift, use the enclosed envelope, or visit dukeprostateurologiccenter.org

TK WETHERELL, PhD, former president of Florida State University, says his prostate cancer care from Dan George, MD, means he can keep teaching classes at Florida State and spending time on his 1,200 acre farm with his wife, Ginger.

"I'm still on this side of the dirt, so that means I'm doing pretty good as far as I'm concerned," he says. "I can get around and ride my tractor and burn fields and do stuff that I like to do. I don't do quite as much as I used to, but compared to what a lot of people are doing at my stage in life, it's not that bad."

JAMES "JIMMY" BARNES of Durham, North Carolina, has been treated for advanced prostate cancer at Duke by Andrew Armstrong, MD, for the last 10 years and has lived with the disease for 24 years. He and his wife, Pat, serve on a cancer support committee at their church and work to educate their community about cancer screening and cancer risk. "I am so thankful for Dr. Armstrong, and I give God all the praise," he says.



"Life changes, but I still have a good life. When I was first diagnosed, I didn't think I would live to be 70."

James "Jimmy" Barnes



James "Jimmy" Barnes with his wife, Patricia.

tate cancer published in 2016 in *Clinical Cancer Research*, Armstrong's team showed that tracking genetic mutations in circulating tumor cells enabled them to predict who was resistant to two drugs, enzalutamide and abiraterone. Results from a larger, multicenter study called the PROPHECY trial will be presented later in 2018.

PATHOLOGIC BONE

In the radium-223 trial, Armstrong's team found that circulating tumor cells in men with advanced prostate cancer had developed genetic mutations and adaptations that re-programmed tumor cells to behave like bone-forming cells. Scientists call this process "osteomimicry." These mutations program the cancer cells to travel to the bone and to form new bone. "But it's pathologic bone that weakens," Armstrong says. "It leads to fractures, it leads to pain." Armstrong presented these findings at the 2018 GU American Society for Clinical Oncology symposium.

The fact that metastatic prostate cancer cells mimic bone also provides clues as to how radium-223 works. Armstrong explains that in the chemical periodic table, radium is right underneath calcium. Because the cancer cells are behaving like bone cells, they see the radium as calcium and absorb it. "But radium 223 is like a Trojan horse; it's radioactive, and it's fooling the cancer cells into taking up that radioactivity," Armstrong says. "Now that we are identifying how prostate cancer cells spread to and survive in the bone, we can develop new strategies to prevent or better treat patients

"Now that we are identifying how prostate cancer cells spread to and survive in the bone, we can develop new strategies..."

Andrew Armstrong

with bone metastases."

Finding out how new treatments work and for whom they work best is a priority for Armstrong, George, and the new center they've launched. Most often, when new treatments are first approved, they have been tested only in patients with advanced disease. But that doesn't mean that is who can benefit the most from them. Several of their studies have aimed to understand if patients do better if some of the newer drugs are used earlier in the disease process. "It's one thing to get a drug approved, but to really understand how best to use it is another," George says.

What if instead of stealing six months, a year, or ten years back from cancer, they could take it all—stop the cancer from ever recurring? "If we even think we can do that, then my goodness, we have to try," George says.

The Bladder Guy

HOW YOU CAN HELP

To support cutting-edge research at Duke Cancer Institute, use the enclosed envelope or visit bit.ly/dcispring2018

BRANT INMAN, MD, MS, is skilled at the major surgeries that no one wants to be unlucky enough to have. “I’m the guy who when you’ve got a tumor this big, you



SHAWN ROCCO

call to take it out,” says Inman, holding his hands up in the shape of a grapefruit. “Yesterday I removed two bladders and replaced them.”

But Inman, the Cary N. Robertson Associate Professor of Urologic Oncology and vice chief of urology, would prefer to put himself out of business; he has set his sights on preventing

bladder cancer. He sees more and more cases in younger patients, and in people who don’t smoke cigarettes, which is thought to be a factor in more than half of cases. “I’m convinced there’s something in the environment,” Inman says. That’s why he’s collaborating with Matthew Breen, DVM, a researcher at the NC State University College of Veterinary Medicine, to study patterns of the disease in both pet dogs and in humans. “Dogs don’t smoke, so why are they getting bladder cancer?” Inman says. In their respective labs, they take bladder cells from humans and dogs and expose them to common environmental chemicals like cadmium and arsenic and then analyze the resulting genetic mutations. They’re looking for “signatures” or patterns in mutation that are unique to particular chemicals. If they find reliable signatures, maybe one day they can simply sequence the genes of a tumor sample to trace the cause of the cancer.



Gold nanostars

“Dogs don’t smoke, so why are they getting bladder cancer?”

Brant Inman

Inman also works to perfect immunotherapy. In 2007 he published the first research describing the role of the protein PD-L1 in bladder cancer. That work helped lead to the approval of immunotherapies called PD-L1 inhibitors that today are showing success in treating the disease. But he isn’t satisfied. “PD-L1-targeted treatments in bladder cancer work to some degree, but they

cure very few people. What can we do to make it better?” he says. He works with Tuan Vo-Dinh, the R. Eugene and Susie E. Goodson Professor of Biomedical Engineering at the Pratt School of Engineering at Duke, to explore using heat and nanotechnology (the science of extremely tiny things, on the scale of atoms) to improve immunotherapy.

Vo-Dinh has developed a technology called gold nanostars—tiny, star-shaped particles that will accumulate in tumors. When heated with a laser, their spiky tips take up the heat efficiently, helping kill cancer cells. In mice with tumors, the researchers found that immunotherapy alone slowed the tumor growth, but didn’t stop it, and the mice eventually died. But when gold nanostars and heat were added, some of the mice appeared to be cured. Several mice were immune to developing cancer even when injected with more cancer cells, suggesting that the immunotherapy plus the nanostars provided a vaccine-like effect. Funded by the Department of Defense, the collaborators are conducting larger studies in which they hope to improve on these results, which were published in *Scientific Reports* in August 2017. “We found one combination that worked, but is that the best one?” Inman says. “Can we administer the treatment in a method that can eradicate the cancer in all of the mice completely, every time?”



NC STATE VETERINARY MEDICINE

Five years after surgery to treat prostate cancer, STEELE DEWEY of Charlotte, North Carolina, was told in 2010 that the cancer had spread, so he and his wife, Molly, decided to seek advice at an academic medical center. They looked at a lot of options but chose Dan George, MD, at Duke because a friend recommended him and because Durham was close. They have stayed because of the personal



BOB LEVINE

“My work load is not what it used to be, but I’m still working, and I feel good.”

Steele Dewey

attention they receive. “I can always get in touch with Dan,” Dewey says. “He’s not only an oncologist, he’s a scientist, and he’s always looking for better ways to do things.” Dewey participated in a Duke clinical trial of exercise for patients with prostate cancer and has continued a workout regimen; he exercises three days a week for two and a half hours, doing a combination of strength training, cardiovascular workouts, and yoga. “I’m probably in a lot better shape than most men my age,” Dewey says. “My work load is not what it used to be, but I’m still working, and I feel good.”

In Progress

TRACKING PROSTATE CANCER LONG TERM

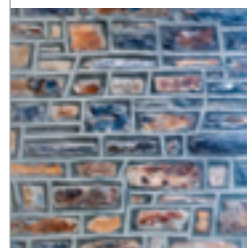
Dan George, MD, co-leads the International Registry to Improve Outcomes in Men with Advanced Prostate Cancer (IRONMAN), which will follow at least 5,000 men from nine countries for three years. IRONMAN aims to understand how new treatments are being used in the real world, and which treatments provide the best outcomes.

INTERNATIONAL PROSTATE CANCER REGISTRY

If you want to register, please visit:
ironmanregistry.org

UNDERSTANDING HEALTH DISPARITIES

African American men are diagnosed with prostate cancer at a higher rate than white men, and they die from it more often. Socioeconomic factors and lack of access to care don’t explain all these differences. Steve Patierno, PhD, deputy director of Duke Cancer Institute, Jennifer Freedman, PhD, an assistant professor of medicine, and colleagues have found that tumor aggressiveness can be traced to differences in gene expression (how genes are translated into proteins) that are found more often in African American men. The work was published in June 2017 in the journal *Nature Communications*. The scientists are exploring further, funded by the Department of Defense, with the goal of personalizing treatments to reduce health disparities and improve outcomes for men of all races with aggressive disease.



RUTH FECKLES



“A treatment will work, and if it stops, he always has something else.”

Marisha Hargrove

Despite living with stage 4 kidney cancer, **MARISHA HARGROVE** of Henderson, North Carolina, still sings in her church choir and takes care of her two children, Paris, age 9, and Carson, age 6. “I know my limits,” says the soft-spoken 28-year old. “If I need to rest, I rest.” She also has the support of her family. In 2013, when she was diagnosed, her general practitioner told her she had six months to live. But her uncle, Steve Hargrove, told the doctors they weren’t interested in hearing about that. “Our family has always pushed her to live,” he says.

At Duke, Hargrove is treated by Michael Harrison, MD, assistant professor of medicine. She had a procedure to cut off blood flow to the kidney that harbors the tumor, and she has taken several

treatments that have shrunk the tumor. “It’s been a great pleasure working with Dr. Harrison,” Hargrove says. “A treatment will work, and if it stops, he always has something else.”

When Hargrove was just a young child, her mother died of the same type of kidney cancer. Testing at Duke revealed that she has a genetic mutation that predisposes her to the disease. When her children reach age 15, she will have them tested for the mutation as well.

Amplifying the Patient Voice

By Aliza Inbari



JAMES STEINBERG

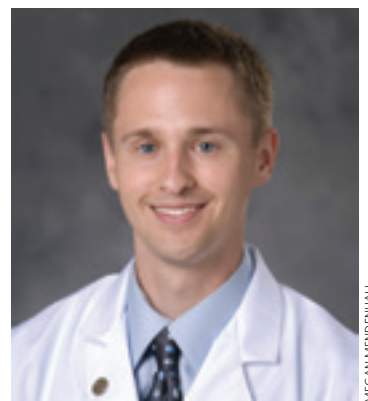
It's something that has happened to all of us; you arrive on time for your 10:30 a.m. doctor's appointment and wait an hour, only to have the doctor spend 15 minutes with you. Doctors are busy people. Thomas LeBlanc, MD, is no different, but early in his career as a medical student, he took special notice of this problem: doctors do not have much time to listen to the patient, and they focus too much on the medical aspects and not enough on the person.

"I saw that we often fail to attend to patients' lived experiences of illness, so I decided to make that a priority in my research and in my practice—to amplify the patient voice in cancer care," says LeBlanc, who treats patients with blood

cancers at Duke Cancer Center Institute (DCI).

LeBlanc, an associate professor of medicine, is excited about patient-reported outcomes (PROs), a set of tools that allow patients to self-report their own experiences via a survey or even an app. PROs give doctors and researchers measurements of the patient's quality of life, mobility, emotional state, social well-being, and daily symptoms.

In recent years, PROs are playing an increasing role in cancer research and care. They help physicians get information directly from their patients about what they are going through and how they are feeling—information that blood work or a physical exam can't reveal. LeBlanc and colleague Amy Abernethy, MD, adjunct



MEGAN MENDENHALL

THOMAS LEBLANC treats patients with blood cancers and has made listening to cancer patients a priority.

professor of medicine, recently reviewed the state of the science of PROs in cancer care, in an article published in the journal *Nature Reviews Clinical Oncology*.

As one way of measuring patient quality of life, the Duke Cancer Patient Support Program uses the National Comprehensive Cancer Network (NCCN) distress thermometer, a paper survey that allows cancer patients to inform their doctors about family, emotional, spiritual, physical, and practical concerns. Nurses and patient navigators at Duke Cancer Institute gather the data and refer patients to the services that can help them.

W “We often fail to attend to patients’ lived experiences of illness, so I decided to make that a priority in my research and in my practice—to amplify the patient voice in cancer care.”

Thomas LeBlanc

LeBlanc is currently working with Cheyenne Corbett, PhD, LMFT, director of the Duke Cancer Patient Support Program, and with DCI leadership on expanding the NCCN distress thermometer initiative to also include symptom screening, which will assess for common symptoms like

pain, weight loss, nausea, fatigue, and physical functioning. They plan to digitize the paper survey using the Duke patient portal (Duke MyChart), so that patients can fill it out electronically before they visit the clinic or in the waiting room. They hope to roll out a pilot program later in 2018.

“Having patients complete the distress thermometer electronically will improve clinicians’ workflow, save time for our nurses in clinic, and help us provide better care to patients,” LeBlanc says.

Corbett adds, “The distress screening tool helps us introduce to patients that we are concerned about how they are coping through their cancer experience and ensure that we continue to ask, so we can help identify challenges early. Digitizing this process will help people access information and services quickly, understand all that is available to them and how it can help, and see the impact of the care through their reported outcomes.”



JARED LAZARIUS

CHEYENNE CORBETT is collaborating to expand a tool that makes it easy for patients to report symptoms and psychosocial concerns.

TO LEARN MORE

To learn more about the Duke Cancer Patient Support Program, visit: dukecancerinstitute.org/cancer-patient-support-program

THE PATIENT VOICE COUNTS

Below are examples of treatments that have been approved by the Food and Drug Administration (FDA) in part because they improved patient-reported outcomes.

Drug: Ruxolitinib (Jakafi), was approved in 2014 for the rare blood cancer myelofibrosis.

How patient-reported outcomes helped:

Ruxolitinib dramatically improved a patient-reported outcome score that measured the total burden of symptoms that patients experienced. Patients with this disease have debilitating symptoms like an enlarged spleen that pushes on their stomach and makes them feel full all the time, leading to weight loss as well as fatigue.

Drug: Gemcitabine, a chemotherapy for pancreatic cancer, was approved by the FDA in the 1990s.

How patient-reported outcomes helped:

The drug improved a composite measure that evaluated patients’ experiences, including pain, maintenance of physical function, and weight loss.





MICHAEL MORGENSTERN

WHAT DOES HEART DISEASE HAVE TO DO WITH CANCER?

BY ANGELA SPIVEY

In 2017, Chiara Melloni, MD, a cardiologist and researcher at Duke Clinical Research Institute, and colleagues published results of one of the first studies to look at management of patients with both cancer and atrial fibrillation (a type of irregular heartbeat).

The study may not have happened if it weren't for a phone call that Melloni received from her dad in 2005, telling her that he had an abnormal finding on a CT scan. Melloni, who had just found out she was pregnant with her first child, immediately flew back home to Italy, and she was there with her parents when her father was diagnosed with lung cancer.

After surgery, radiation, and chemotherapy, her father, a middle-school math teacher who had been active and healthy before the cancer, developed atrial fibrillation, and a few months later his heart muscle was not pumping as well as before. "He was treated poorly for the atrial fibrillation and heart condition," Melloni says. His doctors were

not even sure if the usual treatment for the condition was safe for a patient with cancer. "As a cardiologist, I didn't really understand this," Melloni says. "He didn't have a heart problem before. Why is his heart falling apart?"



JARED LAZARUS

MICHEL KHOURI directs Duke's Cardio-oncology Clinic, which helps cancer patients who are also fighting heart disease or who experience cardiovascular side effects of cancer treatments.

Melloni, an assistant professor of medicine, later learned that what happened to her father was not unusual. A whole field of research and clinical care, called cardio-oncology, has developed to improve treatment of patients who have both cancer and cardiovascular disease, whether the heart disease may occur before the cancer, during cancer therapy, or afterward.

Cancer and heart disease can go hand in hand for many reasons. Cancer treatments, including surgery, can worsen cardiac risk factors and accelerate development of heart disease, including coronary artery disease and abnormal heart rhythms. Traditional chemotherapies and newer cancer treatments can weaken the heart muscle and increase risk for heart failure. (In fact, in February 2018, the American Heart Association issued its first-ever statement on heart disease risks, prevention, and treatment after breast cancer treatment.)

HOW YOU CAN HELP

Your support can fuel work in emerging fields such as cardio-oncology. To make a gift, use the enclosed envelope, or visit bit.ly/dcispring2018

And, as cancer treatments have improved, many cancer survivors are living to older ages, when heart disease most often strikes. According to the National Cancer Institute, cardiovascular issues are the second leading cause of death among cancer survivors, second only to recurrent cancers.

A MYSTERIOUS HEART PROBLEM

One of the primary goals of cardio-oncology is to keep cancer patients' hearts healthy so they can continue to fight the cancer. Carolyn Harraway-Smith, MD, an obstetrician-gynecologist in Greensboro, North Carolina, knows that from firsthand experience. In 2016, she was being treated at Duke for a blood cancer called multiple myeloma when she began taking a relatively new targeted cancer therapy. It caused her major problems. She would get a dose on a Friday, and over the weekend she was so debilitated she couldn't even walk up the stairs in her home. By Monday, she would be recovered enough to go back to work. Her cancer doctors assured her that these were part of the known respiratory side effects of the drug.

Then, as part of preparation for a stem cell transplant, she had an echocardiogram, and it showed a major abnormality in her heart's pumping ability. Her doctors weren't sure if she was well enough to have the stem cell transplant. "I was worried about the transplant being delayed, but because the echo was so abnormal, I was more worried about the potential for something else being wrong with my heart that I had no idea about," she says.

Harraway-Smith was referred to Michel Khouri, MD, a cardiologist and assistant professor of medicine who runs the cardio-oncology clinic at Duke. Khouri immediately predicted that Harraway-Smith's heart problem was a transient side effect of the cancer drug she was taking. He suggested that they discontinue the drug, wait two weeks, then do another echocardiogram. When they did, they could see that her heart function had rebounded. "After my very first visit, once he theorized what was going on, I knew that that was the case, and I felt completely confident in his ability to further manage my care," Harraway-Smith says. She was able to have the

stem cell transplant as scheduled, and she didn't have to endure extensive cardiac tests or take heart medications that she didn't need. Today, she is doing well and is head of her department at Cone Health Women's Hospital.

PUNCHING THE HEART IN THE FACE

Khouri explains that many new therapies target cancer cells more specifically and effectively than traditional chemotherapies. But some of these drugs can cause unintended damage to the heart. Scientists have recently found that heart cells and cancer cells can share pathways, and in some instances, a pathway that fuels growth in the cancer cell can also be a protective pathway important to survival of heart cells and maintaining normal heart function. "When you attack that target in the cancer cell, you can also collaterally attack it in the heart cell, and stun the heart's function; it's kind of like you punched the heart in the face," he says. In some cases, if you stop the drug, the cells can recover, and heart function can normalize.

The field of cardio-oncology, though relatively new, is addressing a problem that affects a large and mostly unstudied group of patients. For instance, in Melloni's 2017 study, which analyzed a registry of 10,000 patients with atrial fibrillation, 25 percent of them also had a history of cancer. The people with cancer had similar outcomes, except that they were at increased risk of major bleeding events. "It's an early study, but it is one of the first to even describe patients with both atrial fibrillation and cancer," Melloni

says. "This population is very common, but we just don't know that much about them."

Melloni's father battled his heart condition and cancer for four years. After his initial surgery and radiation, he was able to fly to the United States to meet his first grandchild—a girl named Giada. He visited the United States several more times, and Melloni flew to Italy as often as she could. "He was fighting to live," Melloni says. "He said 'I want to see you, I want to see the grandkids.' He was not ready to go."



DURING HIS CANCER BATTLE, Chiara Melloni's father, Loris, visited from Italy several times and met his two grandchildren. He lost his fight with the disease in 2009.

Cardiologist **CHIARA MELLONI** became interested in the emerging field of cardio-oncology—the intersection of heart disease and cancer—after her father developed heart problems in the midst of being treated for lung cancer.



During his last trip to the United States, he got to meet his second grandchild, Rebecca. In 2009, he lost his battle, to pulmonary embolism as well as spread of the cancer.

Those four years that her father fought cancer, which Melloni says was one of the most difficult times of her life, led her to pursue cardio-oncology. In 2014, she attended one of the first conferences held in the new field, in Rome. When she returned to Duke, she began looking for others who were interested in this problem. Colleagues connected her with Khouri as well as Gretchen Kimmick, MD, a breast oncologist who became interested in the field after observing many of her older breast cancer patients developing heart problems; and Michael Harrison, a medical oncologist who is conducting a clinical trial of exercise to improve heart function and fitness in prostate cancer patients. They and others have formed a group that meets regularly to brainstorm ideas for expanding cardio-oncology research and clinical care efforts at Duke.

UNCOVERING HIDDEN HEART INJURY

An echocardiogram will show if the heart has lost some of its ability to pump blood. But sometimes the heart is injured but can compensate and continue to pump normally for a while. In the Duke cardio-oncology clinic run by Michel Khouri, MD, patients receive additional imaging analysis that can provide an early warning sign of trouble. Called strain imaging, the analysis directly measures the strength of the heart muscle. Work from Khouri and others, featured in a February 2018 statement on cancer and heart disease from the American Heart Association, indicates that strain imaging can reveal injury to the heart muscle before a conventional echocardiogram can, enabling cardio-oncologists to intervene sooner.





KAREN E. BUTLER

▶▶ **THE 5TH ANNUAL CRUSH COLORECTAL CANCER 5K RUN/WALK** on March 24 honored those whose lives have been affected by colorectal cancer and raised more than \$83,000 for Duke research and community outreach and education. Pictured: Participants were welcomed by members of the Duke colorectal surgery team: **Laura Lewis, NP**; **Bridget Long**, staff assistant; and **Meg Hardy, NP**.

▶▶ **LAXERS CROSS CHECKED CANCER.** The Duke Women's Lacrosse Team dedicated their April 7 game versus Boston College to DCI, raising more than \$6,000.



▶▶ **FREDDY'S FROZEN CUSTARD & STEAKBURGERS** on Roxboro Road in Durham, North Carolina, raised more than \$600 for the Duke Cancer Patient Support Program by asking guests at their pre-grand-opening event to donate. Pictured are Freddy's regional manager **Duane Messerschmidt** and Duke Cancer Patient Support Program's **Kristy Everette**.



▶▶ **TYING THE KNOT.** DCI Board of Advisors Chair **Jonathan Wigser** and his fiancé **Krista Patterson** asked friends to donate to DCI in lieu of wedding gifts; their generous request raised more than \$13,000.

FORWARD
STEPS

DCI Authorized to Offer Commercial CAR T-Cell Therapy

In January 2018, Duke Cancer Institute joined a select group of medical centers authorized to offer a new type of immunotherapy for patients with certain types of relapsed or refractory non-Hodgkin's lymphoma.

Duke is currently one of two centers in the Carolinas and Virginia that are certified and trained to administer this treatment—chimeric antigen receptor T-cell therapy, better known as CAR T-cell

therapy, sold under the brand name Yescarta by Kite Pharma. Yescarta is the first and only CAR T-cell therapy approved by the Food and Drug Administration for the treatment of adult patients with certain types of relapsed or refractory non-Hodgkin's lymphoma.

This individualized gene therapy transforms a patient's own T-cells (white blood cells) into CAR T-cells designed to recognize, attack and destroy cancerous B cells.

To learn more about CAR-T therapy at Duke, call the Hematologic Malignancies and Cellular Therapy Program at **919-684-8964**.

— by Julie Harbin



CAR T-CELL THERAPY involves a painless process in which a patient's white blood cells are removed, transformed into cells designed to recognize and destroy cancer cells, then administered back to the patient.

BECAUSE OF CHRISTOPHER



Twenty-four years ago, Mary Woodall's almost-22-year-old son Christopher was fighting an aggressive brain tumor called glioblastoma. But he persuaded his doctors to let him leave the hospital to participate in a small race to raise money for brain tumor research at Duke. "Between his buddies that were there, and his family, we pushed him around the cross-country track," Woodall says.

Christopher lost his battle with cancer just a few weeks later, nine days before his 22nd birthday.

Woodall has honored Christopher's memory by staying involved with the fundraising event, now called Angels Among Us, which has grown to attract more than 4,000 people every year to raise funds for the Preston Robert Tisch Brain Tumor Center at Duke. "Instead of retreating from the whole thing, I felt like I had to keep up the fight," Woodall says. "It's important to give because you never know when cancer will hit your family."

"It's important to give because you never know when cancer will hit your family."

▶ To learn more about Angels Among Us, visit angelsamongus.org. To volunteer in other ways with Duke Cancer Institute, visit dukecancerinstitute.org



Duke Cancer Institute

YOU CAN SUPPORT THE FIGHT

Gifts to Duke Cancer Institute help us develop new treatments and provide compassionate care. To make a gift, visit bit.ly/dcispring2018, or use the enclosed envelope. Thanks for your support!

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Meet Tipton

In February 2018, Tipton Grodski celebrated his one-year anniversary as a volunteer with **Pets at Duke**. This **animal-assisted therapy program** is based on research showing that visiting with a pet can reduce stress, temporarily lower blood pressure, and combat feelings of isolation. The Duke Cancer Center offers therapy-dog visitation in designated areas of the patient waiting lobby twice a week.

Tipton is a nine-year-old Jack Russell Terrier mix. His "mom" is Corinne Grodski, assistant to Michael B. Kastan, MD, PhD, Executive Director, Duke Cancer Institute.



DIANE LEWIS PHOTOGRAPHY

TO LEARN MORE about Pets at Duke, visit dukecancerinstitute.org/cancer-patient-support-program