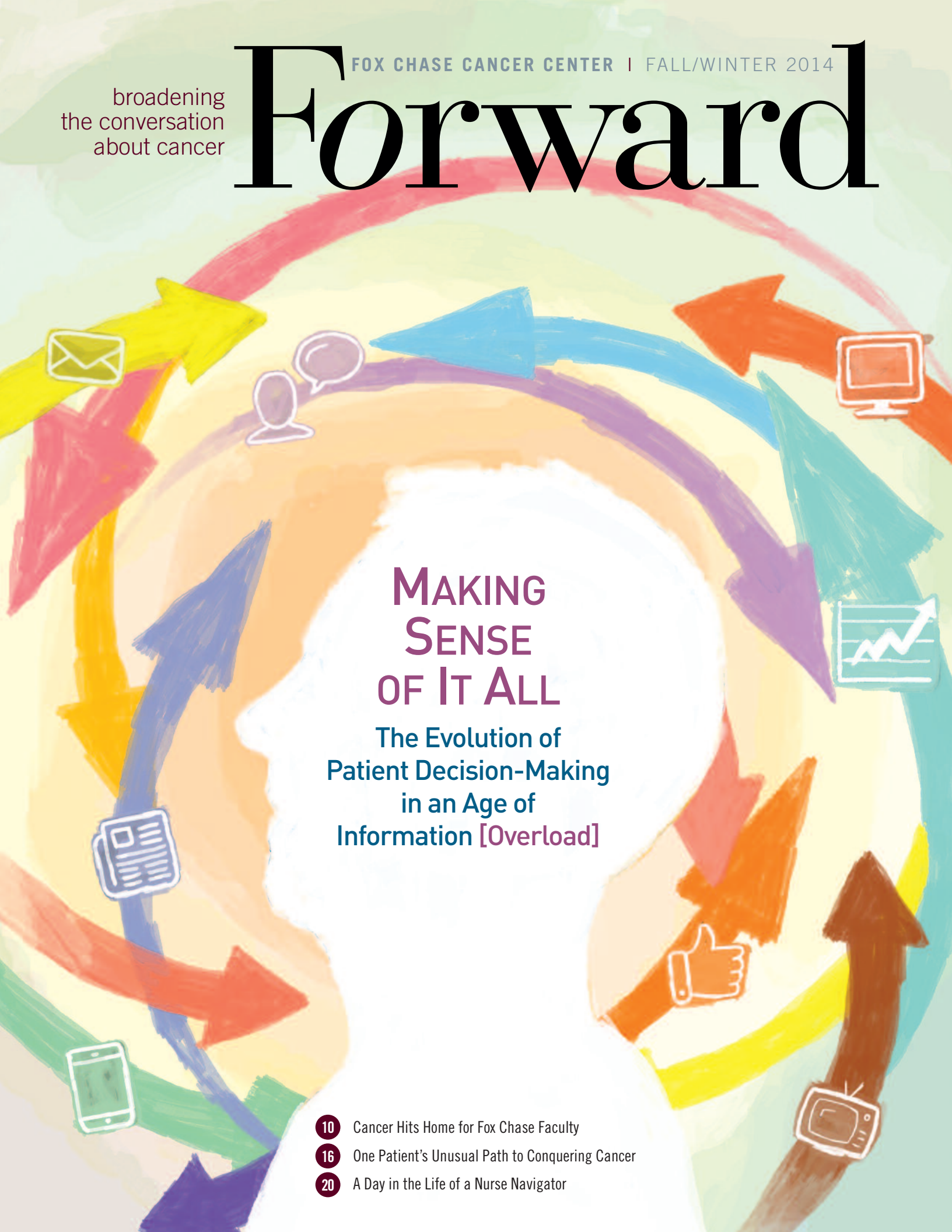
FOX CHASE CANCER CENTER | FALL/WINTER 2014

broadening
the conversation
about cancer

Forward



Making Sense of It All

The Evolution of Patient Decision-Making in an Age of Information [Overload]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That Something Extra

As an organization that focuses exclusively on cancer, we are well aware of the physical and emotional challenges that often accompany a cancer diagnosis. We understand the anxiety that can surround patients and their families—the urgency to have questions answered and begin treatment as quickly as possible.

For this reason, I launched an initiative at Fox Chase in March to offer every new patient an appointment within 24 hours—including those without a definitive diagnosis. I knew it could present a logistical challenge, but our faculty and staff stepped up and made it a reality; thus far every new patient has been offered a next-day appointment.

In this issue, you'll read about other ways Fox Chase is working to ease our patients' experience, to provide that "something extra" beyond expert cancer treatment.

On page 20, take a glimpse into the daily life of a Fox Chase nurse navigator—often the first person to greet patients upon their arrival, or the first voice they hear over the phone. These specially trained nurses are equipped not only to answer clinical questions, but to guide patients through the full gamut of issues that may arise, whether logistical, financial, or emotional. Nurse navigators bring the full complement of Fox Chase resources to ensure our patients benefit from all we have to offer.

We know that the volume of resources and information available to patients today can be overwhelming, both within the clinic and outside of it. In the cover story on page 6, we report on how Fox Chase researchers and physicians are helping patients negotiate the information overload and tease out useful information—empowering them to make more informed decisions about their care.

And in our coverage of "When Cancer is Personal" on page 10, three Fox Chase doctors explain how cancer hit close to home, and how their experiences drive their passion for oncology and inform how they understand and address the needs and concerns of patients.

One such patient is Warren Chambers, who discovered he had a rare, metastatic gastrointestinal cancer despite having no symptoms. Today, having regained his health, Chambers is using his experience to provide encouragement to fellow patients (see page 16).

While we seek to make the cancer journey smoother for our patients, they give something back to us: they make our work rewarding.

Richard I. Fisher, MD
President and CEO

Forward FALL/WINTER 2014

FORWARD magazine is published twice a year for friends of Fox Chase Cancer Center by the communications department of Fox Chase. One of the leading cancer research and treatment centers in the United States, Fox Chase was founded in 1904 as one of the nation's first cancer hospitals, and was among the first institutions to be designated a National Cancer Institute Comprehensive Cancer Center in 1974. Fox Chase joined Temple University Health System in 2012.

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Forward
FALL/WINTER 2014

menu


BRYAN LATHROP

FOX CHASE CONTINUES TO STAND AT THE FOREFRONT OF NURSE NAVIGATION
See page 20


JOE HURLEY

ON THE COVER:
Making Sense of It All
A click of the mouse can reveal a near-endless collection of data points, diagnoses, and treatment options to today's cancer patients. To empower patients to make informed decisions about their care, healthcare professionals at Fox Chase and beyond are helping patients sort through the information overload.

Story on page 6

NEW CLUES ON HOW GIVING BIRTH PROTECTS AGAINST BREAST CANCER

Taking a detailed look at women's DNA and RNA, Fox Chase researchers are unearthing new clues on the relationship between pregnancy and breast cancer.

"We are trying to understand how the natural process of giving birth helps prevent cancer," says Julia Santucci-Pereira, who has been studying the topic. Santucci-Pereira is a molecular biologist in Fox Chase's Breast Cancer Research Laboratory; in 2013 it was named in honor of Irma H. Russo, who co-founded the lab with her husband Jose Russo in 1975.

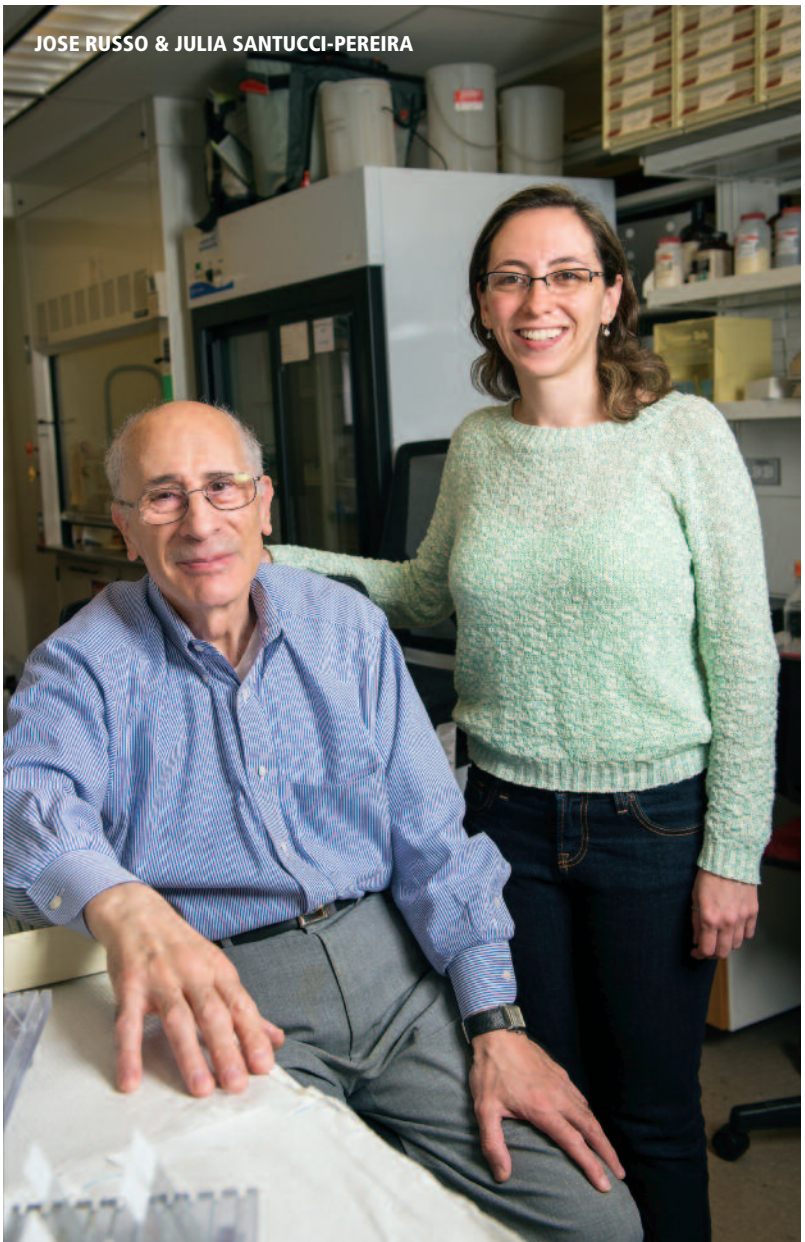
In two recent studies, Santucci-Pereira and her colleagues used sophisticated nucleic acid sequencing technology to compare genetic activity in cancer-free breast tissue samples from more than 100 women—mothers and non-mothers. They found that tissues from the two groups appeared to show differences in the process during which developing cells become specialized types. In addition, they noticed that the influence of genes on the development of breast anatomy was different between the two groups. One possible driver of these changes may be human chorionic gonadotropin, a hormone produced during pregnancy. Jose Russo, director of the Breast Cancer Research Laboratory, is investigating the hormone's effects on cancer.

A third study compared sections of genes in women who had and had not given birth to see how "non-coding" genetic material—which does not contain instructions for making protein—interacts with other parts of the genome, for clues regarding how it may impact cancer. They found 42 different non-coding segments that showed a distinction between mothers and non-mothers.

"Our goal," says Russo, "is to someday replicate these changes and reduce the risk of cancer for women who have not been pregnant."

"Our goal is to someday replicate these changes and reduce the risk of cancer for women who have not been pregnant."

—JOSE RUSSO, Irma H. Russo Breast Cancer Research Laboratory



JOSE RUSSO & JULIA SANTUCCI-PEREIRA

BRYAN LATHROP

INNOVATIVE SURGICAL PROCEDURES PROVIDE RELIEF FOR PATIENTS WITH LYMPHEDEMA

Lymphedema, a painful condition of fluid build-up and swelling in soft tissues, is common among patients who have had lymph nodes removed during cancer treatment. Until recently, there were few options for relief. Two innovative surgical procedures being offered at Fox Chase are changing that.

In a procedure called vascularized lymph node transfer, surgical oncologists Sameer Patel and Eric Chang, who specialize in plastic and reconstructive surgery, are transferring lymph nodes from other parts of a patient's body to the area affected by lymphedema. They reestablish blood flow to the transplanted nodes, which are then able to help drain excess lymphatic fluid from the affected extremity into the veins, where it circulates normally throughout the body.

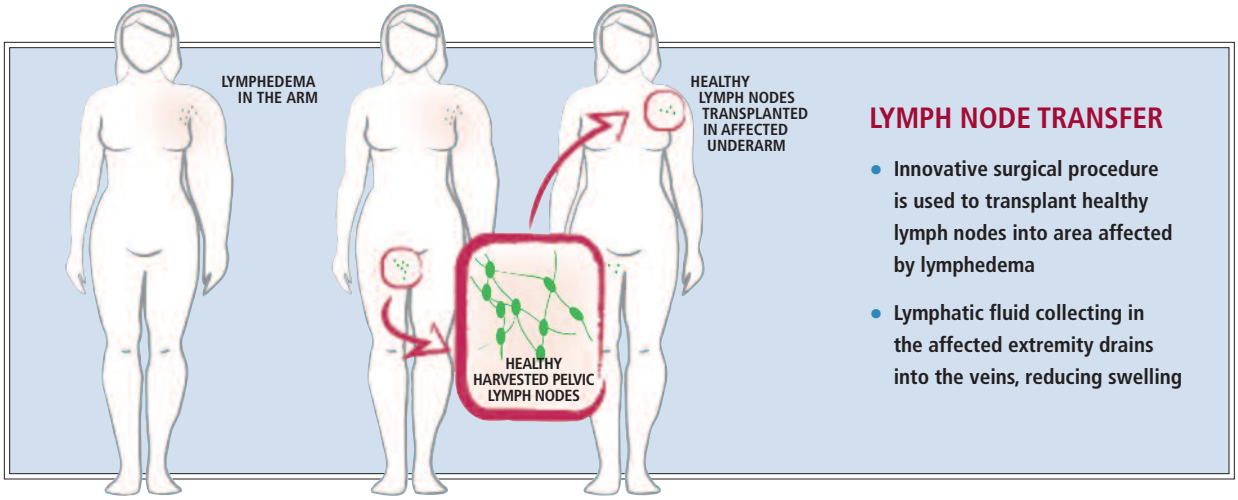
"Lymphedema can cause a significant decrease in patients' quality of life and serves as a constant reminder of their battle against cancer," Patel says.

Lymphedema affects up to about 50 percent of breast cancer patients and up to about 30 percent of gynecologic cancer and prostate cancer patients.

Fox Chase is one of only two institutions in the region to offer vascularized lymph node transfer, which is available at a handful of centers nationwide. The Center will also soon be the only facility in Philadelphia to offer lymphovenous bypass, another option for treating lymphedema. The procedure, which features a shorter operative time and hospital admission, connects the lymphatic vessels directly to small blood vessels in order to allow fluid to drain.

SAMEER PATEL

DAVID DEBALKO



JESSICA HUI

LYMPH NODE TRANSFER

- Innovative surgical procedure is used to transplant healthy lymph nodes into area affected by lymphedema
- Lymphatic fluid collecting in the affected extremity drains into the veins, reducing swelling

STUDIES FIND PROMISING NEW OPTIONS FOR DRUG-RESISTANT CANCERS

Two recent studies led by Fox Chase medical oncologist Ranee Mehra are making promising strides in the development of new treatments for previously drug-resistant cancers.

The first study examines advanced squamous cell carcinoma of the head and neck, which is generally treated with radiation and a chemotherapy drug called cisplatin, an inorganic platinum compound that inhibits cell growth. Many patients do not respond well to this therapy, but oncologists are unable to prescribe alternative agents because they don't know which patients will respond to platinum therapy and which won't. However, Mehra's team found that the level in a patient's tumor of the ERCC1 enzyme, which helps repair treatment-related DNA damage, helps predict a patient's chance of survival. The findings might eventually help guide treatment selection for patients with squamous cell carcinoma of the head and neck.

"The results of this study open avenues to testing other agents that could be more effective in specific patients and have a better side-effects profile," Mehra says.

A more recent study investigated an alternative therapy for patients with a rare type of non-small cell lung cancer, termed advanced anaplastic lymphoma kinase-positive, or ALK+, who are likely to develop resistance to the standard treatment. Results from a clinical trial conducted by Mehra, published in the *New England Journal of Medicine*, showed a favorable response to the new therapy, a drug called ceritinib. Known commercially as Zykadia, ceritinib received approval from the Food and Drug Administration in April, addressing the needs of patients with this type of lung cancer who have progressed on prior therapy.

"The results of this study open avenues to testing other agents that could be more effective in specific patients."

—RANEE MEHRA, medical oncologist

RANEE MEHRA

BRYAN LATHROP


ERICA GOLEMIS

BRYAN LATHROP

INHIBITING "HEAT SHOCK" PROTEINS SHOWS PROMISE FOR SLOWING TUMOR GROWTH

By inhibiting a protein that guides other proteins to fold into stable shapes, Fox Chase researchers have found a way to slow the growth of ovarian tumors. Molecular biologists Erica Golemis and Denise Connolly, together with medical oncologist Lainie Martin and colleagues, discovered that inhibiting heat shock protein 90 (HSP90) significantly depressed tumor growth and caused tumor cell death while showing no evidence of detrimental side effects. It also made cancerous cells more sensitive to standard chemotherapy agents such as cisplatin and paclitaxel.

"Ovarian cancer disseminates widely throughout the abdominal cavity and adheres to the colon and other vital organs. That's what really causes mortality," says Connolly. "Being able to identify therapeutic targets that actively inhibit the process of metastasis should be beneficial to these patients."

The work that led to the discovery at Fox Chase was part of the National Cancer Institute's Specialized Programs of Research Excellence in ovarian cancer. A Phase I/II clinical trial at Fox Chase is now testing the safety and efficacy of the HSP90 inhibitor ganetespib in combination with paclitaxel.

A different team of researchers, led by Golemis, found a potential benefit for treating another condition—autosomal dominant polycystic kidney disease (ADPKD). Their research showed that inhibiting HSP90 slowed the onset of cyst formation and improved kidney function in mice primed to develop a disease comparable to the human form of ADPKD.

A Leading Kidney Cancer Trial Finds a Home at Fox Chase

Offered through the Society of Urologic Oncology, the ADAPT clinical trial is testing a new therapy that harnesses the immune system to fight advanced kidney cancer. Fox Chase is currently the only site in the Philadelphia area enrolling patients in this Phase III clinical trial. The study seeks to determine whether there is an overall survival benefit for patients treated with an experimental therapy, AGS-003, in combination with standard treatment, compared to patients who only receive standard treatment. AGS-003 revs up a patient's immune system by using cancer cells to create new immune cells, which in turn teach the immune system to attack tumors.

ADAPT is one of nearly 200 clinical trials underway at Fox Chase. To learn more about open trials and the innovative clinical research happening right now, visit ***foxchase.org/cancer/clinicaltrials***.

MAKING SENSE OF IT ALL

The Evolution of Patient Decision-Making in an Age of Information [Overload]

By Togo Travalia

A year after his full nephrectomy surgery for papillary kidney cancer, Mark Kabulski thought he had beaten the disease. But at his one year check-up, the Mt. Holly, New Jersey, resident faced a recurrence in his lymph nodes and the prospect of a complex operation.

Kabulski and his wife Barbara sorted through their options with his doctor. Then, as millions of Americans do, he looked online for a surgeon who could perform the procedure and provide follow-up care locally. His search led to Robert G. Uzzo, chair of surgical oncology at Fox Chase.

"When I asked him if he thought he could remove the lymph nodes successfully, [Dr. Uzzo] looked right at me and said, 'Yes, I can get those out, no problem,' and I knew he would. He gave us total confidence that surgery was the best option."

How do cancer patients reach decisions?

Unfortunately, not all searches are as simple or successful.

An Internet search can place thousands of providers, opinions, data points, potential diagnoses, and prognoses at the fingertips of today's cancer patients. The volume of information can do as much harm as good. While a searcher can find information about any type of cancer on the web, ⇛

out-of-context or unmonitored information can yield outdated or unfounded recommendations, create confusion, and prompt unnecessary anxiety. Newly diagnosed patients are particularly vulnerable as they cope with emotional and physical challenges and a plethora of questions about their disease.

Yet the Internet is often a third party in the most intimate discussions between doctors and patients. Its role as information source is the backdrop for the work of Suzanne M. Miller, director of Fox Chase's psychosocial and biobehavioral medicine program. Miller has made a career of studying how cancer patients process information and reach decisions.

She divides patients' information-gathering styles into two basic groups—"monitors" and "blunters." Monitors spend hours poring over information on the Internet and discussing it with their providers. In the other camp are blunters, content to know what they need to know and more willing to trust and accept information from their physicians. Some patients, like Mark Kabulski, fall between the two extremes. He used the Internet to identify his surgeon and research treatment options, then relied on Uzzo to choose the best treatment path.

"Blunters also use the Internet but usually to validate what they've heard from the care provider," says Miller. "Monitors, on the other hand, are more likely to be online all the time, always seeking new options. Monitors may print out what they've found and bring it in to question their physicians. They're thinking, 'Can this be right?'"

Improving the patient-physician relationship

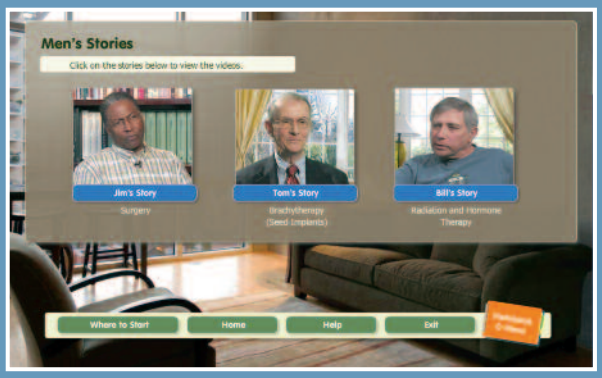
Copyrighted by Fox Chase, Miller's system for classifying patients' decision-making behavior has been translated into hundreds of languages, giving oncologists around the world new insights about how to best support patients and family members, who are also information seekers.

Her work contributed to the development of an American College of Surgeons standard calling for all newly diagnosed cancer patients to take "distress assessments" by 2015, which measure their need for attention to the stress surrounding diagnosis or treatment. The results, which will be listed on patients' electronic medical records, will help prepare the whole care team for more productive interactions with their patients.

"You have to remember that patients' time with physicians is limited," Miller points out. "Knowing how a patient might process information helps physicians be more attuned to patients and in control of situations."

To help patients, Miller and fellow Fox Chase behavioral researcher Kuang-Yi Wen developed a series of web-based

"HEALING CHOICES" AND "PATHWAYS TO RECOVERY," web-based programs developed by Fox Chase behavioral researchers, help breast and prostate cancer patients weigh treatment options and navigate survivorship.



modules that will walk cancer patients through a customizable decision-making process. It is replete with resources: a virtual physician and health educator, video stories from survivors, a questionnaire, and a virtual "room" where the patient can list, and weigh, the pros and cons to reach a high-quality, informed decision about treatment options. The first modules, for prostate and breast cancer patients, are in final testing before patients begin using them next year.

What does good information look like?

Another important venue for patient information-gathering is Fox Chase's Resource and Education Center (REC), a patient and family multimedia learning center that forms the hub of the Center's health education program.

On any given day, you can see patients at computers in the REC, accessing information, with a professional health educator nearby to assist with questions. When the REC opened in 2000,

AN INTERNET SEARCH CAN PLACE THOUSANDS OF PROVIDERS, OPINIONS, DATA POINTS, POTENTIAL DIAGNOSES, AND PROGNOSES AT THE FINGERTIPS OF TODAY'S CANCER PATIENTS.

it was one of the nation's first staffed resource centers for cancer patients and their families. Today, the model still has few peers and recently passed the landmark of serving 40,000 patients.

"One-on-one interaction between patients and health educators is the key," says Stephanie Raivitch, director of health communication programs. "Many other facilities provide self-serve resource areas. Our patients and families receive personal attention and can be assured that the information they are provided is evidence-based and communicated in plain language."

All the resources at the REC are carefully selected to meet these standards. Patients and families find a variety of options, including publications, fact sheets, periodicals, and websites, to meet their learning needs. They can also review a list of approved websites, which the REC vets through a sophisticated website evaluation tool. More extensive than any other in use today, the tool ensures that websites are accurate and current. Staff members actively maintain and update all resources in the REC.

As a complement, Fox Chase's Patient Education Department provides printed and online educational materials to staff and patients in clinics, on display racks, and on bulletin boards throughout Fox Chase. The department's Patient Education Committee, composed of patients and family members as well as nurses, social workers, and a range of other healthcare professionals, carefully reviews these materials for credibility, accuracy, and readability.

And in an effort to make information portable, health educators from the REC have uploaded educational apps and e-books onto iPads and shared them with patients in the chemotherapy infusion room. "It's an important way to reach even more patients. We can now go to those who can't come to us," says Raivitch.

This comprehensive approach to getting good information into patients' hands is one of the qualities sought by the National Cancer Institute when designating Comprehensive Cancer Centers—a distinction Fox Chase shares with only 40 other centers nationwide.

"Just like the patient care we perform and the biomedical research we conduct, our public education and outreach are held to an extremely high standard," says J. Robert Beck, chief academic and administrative officer.

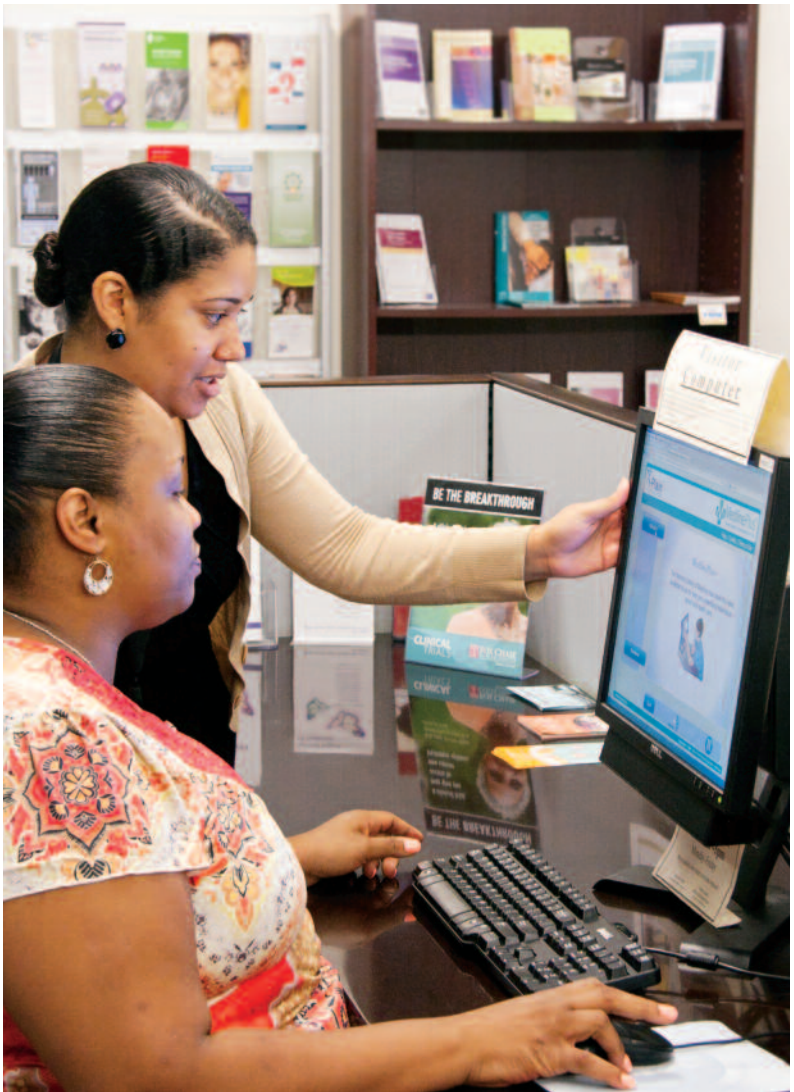
> "ONE-ON-ONE INTERACTION BETWEEN PATIENTS AND HEALTH EDUCATORS IS THE KEY."

Harnessing technology to engage patients

The patient's online search for health information is here to stay, and the ability to navigate cyberspace will only grow in importance. In a June 9 article in *The Wall Street Journal*, reporter Laura Landro described patient engagement as the "last mile in the race to fix health care" and hailed new online tools as the key to making it happen. While a 2012 Institute of Medicine report cited patient engagement as the key to an effective healthcare system, the Center for Advancing Health in 2010 showed it is still an uphill climb: more than half of Medicare patients don't bring a list of questions to doctor appointments, and 61 percent of Americans don't maintain their own medical records, whether paper or electronic.

Health systems are responding by giving patients access to their health records online. Patients can check lab results or a doctor's notes; the tech-savvy can plug personal information into new health apps and generate a personalized fitness regimen that takes into account their weight or an injury. Of course, not all patients are equally facile with online tools, so providers are starting to meet them halfway.

Fox Chase urologic oncologist Alexander Kutikov is among physicians who have integrated technology into the clinical experience to boost patient engagement and understanding.



JESS HUI

Health educator Kelly Lopez advises a patient visiting Fox Chase's Resource and Education Center.

> “PATIENTS ARE BECOMING TRUE, ACTIVE PARTNERS IN MEDICAL DECISIONS.”

“I’ve witnessed a general shift in the approach to care since medical school. Patients are becoming true, active partners in medical decisions,” says Kutikov. “But engaging patients as participants means showing them information about options and outcomes, and then enabling them to overlay their value systems onto a particular decision. Technology can now help facilitate this process.”

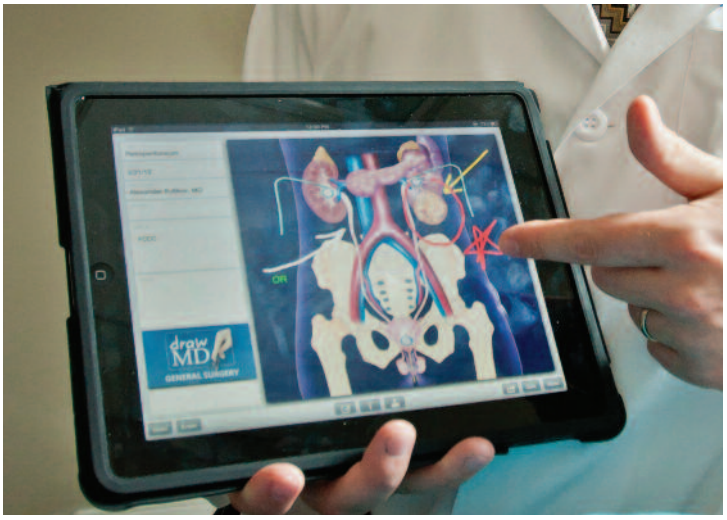
With more than a half-million downloads, drawMD, a suite of iPad apps that Kutikov co-developed with Harvard Medical School classmate Todd Morgan and technology expert John Cox, is used nationally and internationally, including at Fox Chase. The app offers a dozen anatomical palettes on which physicians can visually explain surgical procedures by creating patient-specific images.

“Dr. Kutikov spent time with me, showing me what my surgery would involve, drawing on a hand-held device,” says Marie Fiss, who needed removal of her right adrenal gland due to a rare tumor growth known as pheochromocytoma. On an electronic tablet, Kutikov showed her how just a few small incisions would allow him to operate laparoscopically. “I left feeling informed and encouraged and knowing I was in the best of hands,” Fiss says.

Kutikov describes the app as “a dynamic piece of paper. It supports decision-making because the best surgical option may not be the latest procedure. Our group in urology prides itself on being trained in all modalities, including traditional open surgery, laparoscopy, and robotics. With drawMD, we can help a patient see the trade-offs among various surgical options and facilitate a time-sensitive decision.”

Kutikov notes that no single electronic tool can provide complete information. He also uses MedlinePlus.com, a comprehensive online reference library developed by the National Library of Medicine and National Institutes of Health, and CancerNomograms.com, a Fox Chase tool that generates point-of-care predictive models of outcomes and survival rates for bladder, kidney, penile, prostate, and testicular cancer.

Fellow NCI-designated Comprehensive Cancer Centers have also begun designing tablet-ready resources. Dana-Farber/Harvard Cancer Center created Ask the Nutritionist: Recipes for Fighting Cancer, an app to help patients find an optimal diet for their particular type of cancer. An MD Anderson Cancer Center app connects patients through social media accounts to the center itself, fellow patients, and caregivers. And the About Herbs app, developed by Memorial Sloan Kettering Cancer Center, lists more than 200 monographs describing the purported uses, adverse effects, and drug interactions of various herbs, supplements, and complementary therapies.



LISA BAILEY / TOMMY LEONARDI

Top: The drawMD app, developed by Fox Chase urologic oncologist Alexander Kutikov, can demonstrate trade-offs between surgical options. Bottom: Kutikov uses an iPad to illustrate a surgical procedure to patient Marie Fiss.

Even as technology plays an increasingly significant role in cancer patient education and decision-making, Kutikov acknowledges that it only goes so far.

“Nothing is ever going to replace the sincere and well-explained conversation with a patient about their options and the uncertainties about their outcomes,” he says. “Some patients need to feel empowered. It’s the physician’s responsibility to let that happen after gauging how much control of the process a patient wants and needs.” ◆

When CANCER is PERSONAL

Cancer hits home for Fox Chase faculty, influencing their drive to care and cure

By Denise Portner
Photos by Bryan Lathrop

VICKI WAS A QUIET GIRL with short, sandy blonde hair, who lived in Klingerstown, Pennsylvania, 40 miles north of Harrisburg. When she was diagnosed with leukemia in 1970, the announcement made a big impression on her second-grade classmates.

"I remember vividly. The teacher asked us to speak into a tape recorder with a message for her, and shortly thereafter, she died," recalls David Wiest, Fox Chase's deputy chief scientific officer and co-leader of the Immune Cell Development and Host Defense research program.

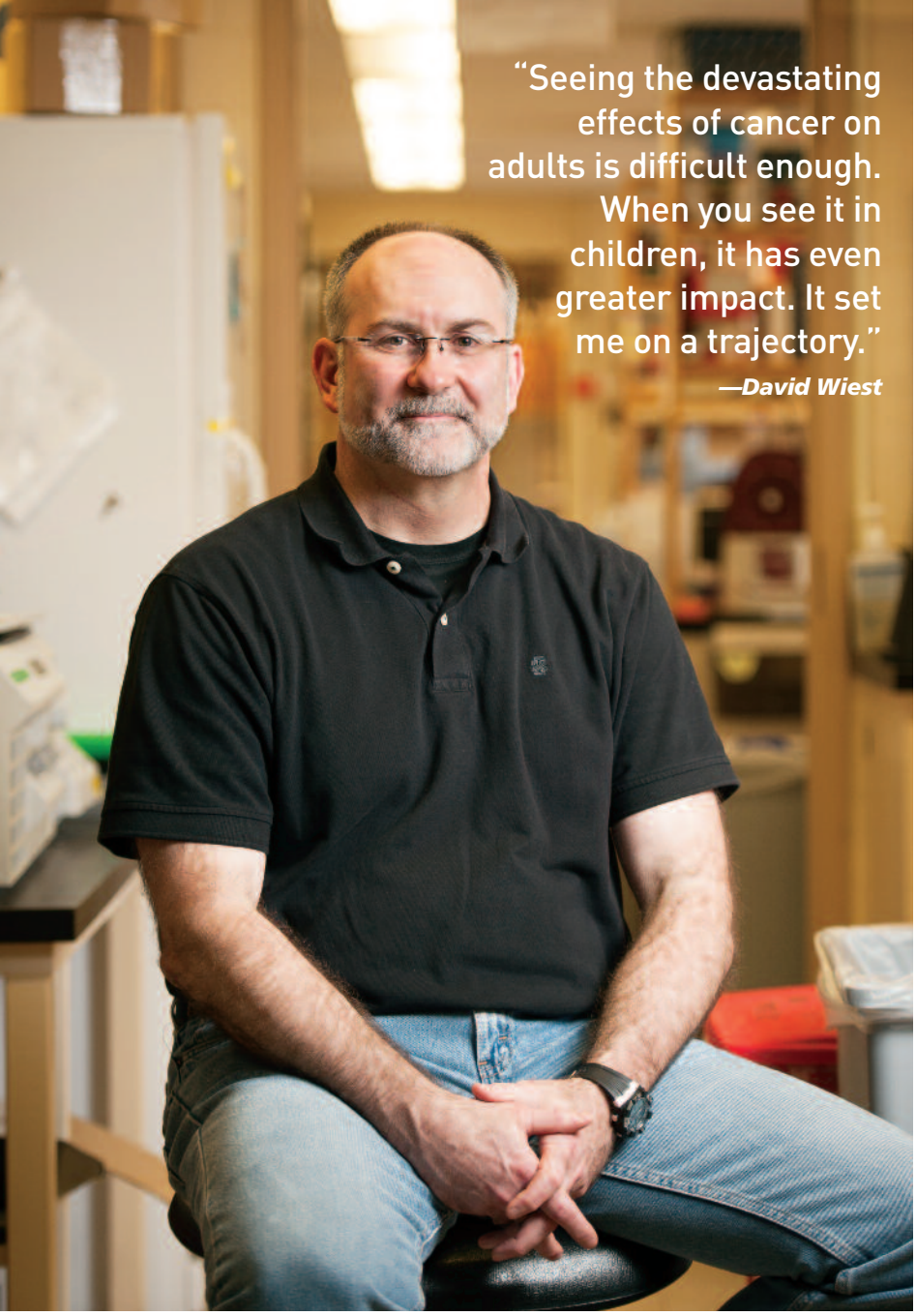
Today, Wiest is an immunologist who studies how proteins control the behavior of T cells, which coordinate the body's immune response.

Lab research sparked his fascination with immunology while he was a college student at Penn State. How could the immune system be both a source of cancers and a tool for treating them? Despite a physician's warning that he was a "starry-eyed optimist" for his choice of research, Wiest continued his studies of the immune system in a PhD program at Duke University. Then, over a four-year fellowship at the National Cancer Institute, Wiest again came face to face with pediatric cancer. Entering the Warren Grant Magnuson Clinical Center, he frequently encountered bald children sitting in wheelchairs on the portico.

"Seeing the devastating effects of cancer on adults is difficult enough," Wiest says. "When you see it in children, the impact is even greater. It set me on a trajectory. When it came time to look for jobs, my mentor recommended I look at Fox Chase. Here I found real value placed on basic research coupled with the ability to see if it mattered clinically."

In 2007, Wiest proposed assembling a team to investigate the clinical relevance of research in basic immune cell development that his lab and other Fox Chase investigators were doing. "Our work fit with Dr. Stanley Reimann's philosophy," Wiest notes, referring to the founder of Fox Chase's scientific enterprise. "To understand cancer, you must first understand normal biology."

Wiest found a gene that was required for the development of T cells. "Normally, 60 to 70 percent of kids with leukemia are treated successfully, but we found that this gene was inactivated in about 10 percent of patients, and those patients had a significantly poorer prognosis," Wiest says. "It led me on a path to determine how inactivation of the gene made cancer more aggressive and to devise strategies to treat those cases." ⇒



In fall 2013, Wiest's team received a Leukemia & Lymphoma Society grant to study the role of a molecule that regulates cellular stress responses, which can contribute to the origin and development of cancer. The team will look for a way to defeat cells that have a mutation that makes them more aggressive, developing therapeutics that block stress responses in patients with acute lymphocytic leukemia.

Wiest is aware he is not the only researcher whose work at the bench is motivated by people who have wrestled with cancer.

"I would venture to say that every researcher at Fox Chase has had a direct or indirect encounter with cancer," he says. "That exposure drives you."

AN INSPIRED QUEST FOR A CURE

A painting by Elena Gitelson called "Philadelphia: The City of Brotherly Love and The Philadelphia Chromosome" hangs on the second floor of Fox Chase's Robert C. Young, MD, Pavilion. The colorful, Chagall-like work depicts a surreal Philadelphia cityscape along a river at sunset. Overhead, a couple flies into the sky, as a flock of birds and chromosomes rise with them, all to meet at a distant point where the triumph of science and human spirit will intersect.

◊◊◊

Igor Astsaturov and Elena Gitelson met in Moscow while they were in a residency program at the Russian Hematological Research Center. In 2005, they moved to Philadelphia for fellowships at Fox Chase. Gitelson finished her residency and oncology fellowship at the Fox Chase/Temple University Program, and in 2009 joined the faculty at Thomas Jefferson University as an oncologist focused on hematological malignancies. Astsaturov joined Fox Chase as a physician-scientist specializing in gastrointestinal cancers, including pancreatic, liver, and colorectal cancers.

The couple was living busy professional lives when, in 2012, experiencing unrelenting back pain, Gitelson arranged for a CT scan. Reading her own images the same day, she noticed an ominous looking mass in her pancreas and multiple lesions in her liver, which she immediately recognized as metastatic pancreatic cancer.

Gitelson was determined to fight the disease—as a patient, but also as a researcher. Knowing that tumor models are crucial ⇛

"I would venture to say that every researcher at Fox Chase has had a direct or indirect encounter with cancer. That exposure drives you."

Igor Astsaturov stands in front of his wife Elena Gitelson's painting "Philadelphia: The City of Brotherly Love and The Philadelphia Chromosome."

⇒ for research, she had a sample of her tumor frozen and added to Fox Chase's vast tissue sample repository. Astsaturov's lab grafted the tumor sample in immunocompromised mice—a technique they had just established in order to study the behavior of patients' tumors outside the human body. As the tumors grew in mice, Gitelson began chemotherapy.

Equipped with the new mouse model, Astsaturov assembled a team to study pancreatic cancer and find ways to suppress its growth. Together with pharmaceutical companies; his former colleague and mentor, medical oncologist Louis M. Weiner; and multiple investigators at Fox Chase, Astsaturov conducted a massive search for agents active against pancreatic cancer. Sadly, answers didn't come soon enough for Gitelson. She died in 2013.

"Elena's disease and her death changed all of us. She has been an inspiration for everyone around her."

"I was a gastrointestinal medical oncologist involved in taking care of patients, but now it's something very personal," says Astsaturov.

In the wake of Gitelson's passing, Astsaturov has become active in PANCAN, the Pancreatic Cancer Action Network, a non-profit advocacy organization, running in 5K races and lobbying members of Congress for increased funding. PANCAN was instrumental in securing passage of the Recalcitrant Cancer Research Act of 2012, instructing the National Institutes of Health to fund research on cancers with particularly poor outcomes, including lung and pancreatic cancer.

According to the National Cancer Institute, pancreatic cancer is the fourth leading cause of cancer death in the United States and is on track to become the second by 2020, behind lung cancer. Overall, just six percent of patients survive five years after diagnosis. Yet only two percent of the federal government's five billion dollar budget for cancer research is devoted to pancreatic cancer. Current hope for controlling the disease lies in further identifying risk factors and genetic changes, achieving greater understanding of the metastatic process, and developing better methods of early detection and treatment.

Astsaturov's lab, one of five in the translational pancreatic cancer research program at Fox Chase, remains devoted to understanding the biology of the disease in order to develop treatments. Astsaturov says his wife's passing hasn't changed the way he practices medicine, but it has made him acutely aware of the burden on caregivers. "I know firsthand what they are going through—not only the patients but their family members. When you go home, you don't forget about them."

Today, Gitelson's memory lives on through Astsaturov's work and that of her son, Sergei, 34. Formerly a software engineering manager at Amazon, he has taken a research position at the European Molecular Biology Laboratory in Heidelberg, Germany, where he will be studying pancreatic cancer genomics.

At Fox Chase, Gitelson will be remembered through the Elena Gitelson Chief Fellow honor, which is awarded each summer to a hematologic oncology fellow who embodies her commitment to education and research.

"Elena's disease and her death changed all of us," Astsaturov says. "She has been an inspiration for everyone around her."

A NEW PERSPECTIVE ON MEDICINE

"I remember my dad saying, 'This is going to make you a better doctor,'" says medical oncologist Crystal S. Denlinger of her father Edgar's journey with metastatic kidney cancer. From his diagnosis when she was in high school to his passing in 2008, the progress of his cancer shaped Denlinger's development as an oncologist.

Denlinger's frustration at the lack of therapies for kidney cancer available in the 1990s and early 2000s "drove me to what I ultimately ended up doing as an oncologist—caring for patients, developing new cancer treatments, and advocating for

survivors," she recounts. "I knew what it was like to face a cancer without a lot of treatment options, so I was drawn to gastrointestinal cancers." Treatment options and prognoses are typically poor for these cancers.

When Denlinger came to Fox Chase in 2004 for a medical oncology fellowship, she had her father meet with Robert G. Uzzo, chair of surgical oncology, and Gary R. Hudes, a medical oncologist. "Dr. Uzzo was confident he could treat the tumor on my dad's remaining kidney," she says. He removed three small tumors and saved her father's only kidney without affecting renal function.

Following pancreatic surgery to remove a metastasis from his kidney cancer in 2002, Edgar had quit his job as a PhD-level research engineer because his physician thought the stress of working was contributing to his illness. "To not be working and doing research was hard for him," Denlinger recalls. "I joked with him that he got his MD the hard way. He knew more about kidney cancer than I did."

Crystal Denlinger and her mother Cynthia, a five-year breast cancer survivor.

"I remember my dad saying, 'This is going to make you a better doctor.'"

By 2006, Edgar's disease had metastasized to the point where it could no longer be removed surgically. He enrolled in a Phase I trial for kidney cancer but did not have good results.

Additional drugs now available for kidney cancer were not approved quite soon enough to help him. He was hospitalized for much of the last year of his life, after the cancer had spread to his brain, and he died in 2008. During that year, Denlinger split time between being doctor and daughter, sleeping over some nights in the hospital, boosted by the support of her colleagues. "I'm eternally grateful to the entire clinical staff of Fox Chase, both for the care they provided to my father and for their support during the hardest time in my life," she says.

Nine months after her father's passing, Denlinger's mother, Cynthia, was diagnosed with breast cancer. Treated at Fox Chase by medical oncologist Lori Goldstein and surgical oncologist Elin Sigurdson, she is now a five-year survivor.

"My experiences changed the way I practice," Denlinger says. "I certainly know what the family member sitting in the chair at the side of the exam room feels like, and I identify with the children of parents with advanced cancer. I know what it's like to get news you may not want to hear. Now I walk in and give the CT results first, because I know that's what I wanted to hear."

"It's also why I'm passionate about the survivorship program and the importance of clinical research to develop new treatments," adds Denlinger, who has led the charge to organize and formalize the services that Fox Chase offers to its survivors. She chairs the National Comprehensive Cancer Network's Survivorship Guidelines panel, which develops standards for survivorship care, and remains actively involved in clinical research, serving as an investigator on a number of early-phase clinical trials for gastrointestinal cancers.

"I am proud to be my parents' daughter," Denlinger says. "They are both my heroes for everything they lived through and their strength." ◇

RISING STARS

Attracting rising stars is central to Fox Chase's tradition of leading cancer research. *Forward* gathered together four young scientists who have recently joined the Center—James Duncan, Sergei Grivennikov, Neil Johnson, and Stephen Sykes. They talked with Glenn F. Rall, an immunologist who serves as the Center's associate chief academic officer, about what drew them to a career in cancer research and what keeps them motivated in their search for the next big discovery.

GLENN RALL: ***Science has been a lifelong interest of mine. I was a little kid in 1969 during the Apollo 11 mission, which is when I knew that was I going to be an astronaut. The fact that I was chubby and clumsy and got easily nauseated didn't seem to get in the way of my capacity to have a true career in space. How about you, James? Did you always want to be a scientist?***

JAMES DUNCAN: My entire family is chemical, electrical, and mechanical engineers. I'm the only non-engineer, a black sheep if you will. My interest in science was sparked by a movie, "Medicine Man," starring Sean Connery. I was in grade school and was fascinated with his character's ability to go off into the jungle and find a drug. I thought it was that simple. Now I realize that what I'm doing is as close as it gets—my lab is devoted to drug discovery and finding new therapeutic targets.

SERGEI GRIVENNIKOV: After second or third grade, I knew I wanted to be a scientist. For a while I wanted to be a chemist because I thought all of the colorful stuff in chemistry was cool. Both of my parents are biochemists, so they used to bring home reagents from their lab for me to experiment with. We had a small summer house and I started doing chemical experiments there. Eventually my interests led me from chemistry to biology and molecular biology, to immunology, and then finally to cancer research.

RALL: ***Steve, did you have any relatives in science or medicine?***

STEPHEN SYKES: No, it was completely foreign to me. I'm like James in that it was a movie that first got me interested in research. Terribly, it was "The Rock" starring Nicolas Cage as a biochemist. I saw that when I was 17 and was blown away. It's on Alcatraz and he's pulling out these beads with this neurotoxin and I was hooked after that.

> ***"There's only one reason why patients come to Fox Chase. If you think about the number of people that walk through this door, it's pure motivation."***
>
> *—Stephen Sykes*

RALL: ***That's no surprise! I've heard that a lot of kids are now interested in virology because of movies like "Outbreak" and "Contagion." They see how on-the-edge the field is, with things like hazmat suits and its many other precautions and innovations. If it takes Hollywood to move the field forward, then that's okay. All of you eventually ended up in cancer research—what in particular drew you to the field?***

SYKES: I was intrigued by the effect the word "cancer" can have on people. No one uses that word lightly. Being able to see the way my parents reacted to it stuck with me. Several of my family members died of cancer, so I decided I wanted to learn more about it.

NEIL JOHNSON: The biology of cancer is very interesting. It's an extremely complex disease so there's always more work to do.

RALL: ***It certainly is a vast field, which can be overwhelming. What do you do to keep motivated? What sparks your creativity and new ideas?***

GRIVENNIKOV: I look to colleagues in neighboring fields of science for fresh perspectives and new ideas. In exchange, I help them with their projects and offer them new ways to look at concepts.

JOHNSON: If I have several different ideas, my strategy is to get started on all of them at once and

> *My creativity is driven by the desire to discover something new, that no one has ever observed. I like to try unconventional approaches. That's when true discoveries are made.*
>
> —James Duncan

see what takes off the quickest. The most promising idea will eventually reveal itself.

SYKES: I look to the potential clinical relevance of my work with acute myeloid leukemia (AML) for inspiration. I start with the big-picture clinical problems within AML, like its high mortality rate and resistance to current therapies, and drill down from there. I think the best creative ideas come from looking at something two inches away from your face and then 20,000 feet away.

DUNCAN: My creativity is driven by the desire to discover something new that no one has ever observed, and to figure out how those new concepts can be used to help treat people with diseases such as cancer. Most of my ideas stem from unanswered questions that exist in the scientific literature. I very much like to try unconventional approaches. That's when true discoveries are made.

RALL: ***One of the unique things about Fox Chase is that scientists are right down the hall from the clinic—we all kind of share the same space. Has this had any effect on you as you've begun your career at Fox Chase?***

SYKES: It really hits home with me when I'm walking around the Center, or I stop down to get coffee, and see patients. The thing about being at a cancer center is that there's only one reason why patients come here. If you think about the number of people that walk through this door, it's pure motivation.

GRIVENNIKOV: Seeing patients always reminds me of the importance of translational research. We need to come up with innovative approaches to making advanced cancers curable that will become the standard of care in the next decade.

Photos by Bryan Lathrop

THE NEWCOMERS

James S. Duncan

Home Country: Canada
Research Interest: Alterations in cellular proteins that lead to drug resistance
Disease in Focus: Breast and ovarian cancer
Would Love to Visit: Australia

Sergei Grivennikov

Home Country: Russia
Research Interest: The connection between inflammation and cancer
Disease in Focus: Colon and liver cancer, autoimmune diseases
Would Love to Visit: French Polynesia

Neil Johnson

Home Country: England
Research Interest: How cancer cells repair or deal with damaged DNA
Disease in Focus: Hereditary forms of breast and ovarian cancer
Would Love to Visit: Nova Scotia

Stephen M. Sykes

Home Country: Canada
Research Interest: Molecular mechanisms that lead to tumor development and drug resistance
Disease in Focus: Acute myeloid leukemia
Would Love to Visit: London

A Power Play on Cancer

By Katie Derickson

Warren Chambers started the day like he did many others—a five-mile run, a shower, then off to a lunch meeting. It was at lunch that he realized something was wrong.

"I had difficulty swallowing," says Chambers. "I knew I had a busy few days ahead and just didn't want to go to the hospital. I was up all night and eventually made peace with the fact that I needed to go to the doctor."

At the emergency room, Chambers was diagnosed with a late-stage metastatic gastrointestinal stromal tumor (GIST), a rare cancer that had possibly spread to his liver. Doctors described the tumor as "the size of a large cantaloupe."

"Out of nowhere this big C crept up on me," says Chambers. "When the doctor gave me the results, I was shocked. He asked about the mass in my stomach and I said, 'What mass? I ran five miles yesterday.'" Chambers had exhibited no symptoms prior to his sudden inability to swallow.

Chambers researched cancer treatment centers and, with advice from friends and colleagues in the medical field, decided on Fox Chase for his care. Initial consultations with Margaret von Mehren, a medical oncologist, and James C. Watson, a surgical oncologist, turned up some good news—Chamber's biopsy specimen had positive reactions to the oral chemotherapy Gleevec. After six months of chemotherapy, his tumor had shrunk to the size of a golf ball, and Dr. Watson was able to remove it surgically.

"I owe so much to the Flyers and 76ers. When I was at my sickest, they were loyal customers. They helped me keep my business afloat when I was battling."

NEAL SANTOS

Warren Chambers (left) and Jim McCrossin (right), the Flyers' athletic trainer and strength and conditioning coach, at the team's practice facility in Voorhees, New Jersey.

BALANCING CANCER AND CAREER

Before his diagnosis, Chambers had started a line of personal care products inspired by an unusual ingredient—magnesium sulfate, also known as Epsom salts. "When I was little, I remember my grandmother walking around with an apron pocket full of bath salts," says Chambers. "Both she and my mother instilled in me that making products from these salts would bring me joy."

During his freshman year at Memphis State University, Chambers worked as a technician in the University of Tennessee College of Medicine's oncology laboratory, where he learned some fundamentals of the science of human skin and connective tissues. This knowledge, combined with an interest in alternative medicine, led Chambers to partner with Arthur Sumrall, a dermatologist and founder of the Longevity Institute of Indiana, and develop a line of salt soaks, creams, and sprays made with magnesium sulfate, which helps reduce inflammation and relieve joint pain and muscle soreness.

"To have a rare cancer and be able to share my story, or just to offer a simple kind word of encouragement to other patients who are in need of support, means the world to me."

What started as a casual interest soon grew into a successful business as professional football, basketball, and hockey teams began using the products. In Philadelphia, Ed Snider, then owner of the Flyers and 76ers, brought the products to his teams. But when Chambers was diagnosed with GIST, the company was just beginning to thrive. "I owe so much to the Flyers and 76ers," Chambers says. "When I was at my sickest, they were loyal customers. They helped me keep my business afloat when I was battling."

GROWING A COMMUNITY OF SUPPORT

After his initial treatment and surgery in 2007 and 2008, Chambers bounced back to his routine of running and exercise. A relapse in 2011, requiring Dr. Watson to remove a second tumor as well as part of his colon, left Chambers with a far more difficult struggle to regain his physical health and strength.

"From surgery, my blood pressure was elevated, my kidneys were not functioning normally, and I was experiencing inflammation and pain through my entire body," explains Chambers. "I started thinking about my research and what my grandmother had taught me about magnesium. I asked the nurses—with my physicians' approval—to apply the magnesium cream and spray on my legs."

Chambers realized he might also be able to provide relief to other cancer patients. Through speaking engagements, media stories, editorials in health magazines, and his testimonial on the Fox Chase website, Chambers has been connecting with cancer patients and survivors. It has become an important part of his personal healing process.

"Being diagnosed with cancer is one thing, but surviving is another," says Chambers. "To have a rare cancer and be able to share my story, or just to offer a simple kind word of encouragement to other patients who are in need of support, means the world to me."

Chambers still uses magnesium sulfate to help counter kidney issues he experienced from an increase in his chemotherapy dosage. It was hard not to laugh, he says, when a visit to a nephrologist ended with a recommendation to reduce his inflammation and protect his kidneys using Epsom salt soaks. "I told him I was already on the case." ◆

The boutique is named for Louise Binswanger. A longtime Fox Chase friend and patient, she was known as "Boo" by her grandchildren, who painted the tiles in her memory.

Welcome Home

BOO'S BOUTIQUE SUPPORTS A HOLISTIC APPROACH TO TREATMENT AND RECOVERY

Boo's Boutique, nestled within the Women's Cancer Center at Fox Chase, opened in 2012 and offers fashionable, specialized products and personal services for women undergoing cancer treatment and in recovery. Located in the Young Pavilion corridor near the gift shop, the boutique partners with Jay Ann Intimates, whose specially trained team fits women for post-surgical bras and prostheses while renewing hope that "the new you" will remain beautiful. Visitors can also register for Reiki treatments offered at no charge for patients and families. By providing these services in-house, the Boutique helps Fox Chase achieve its mission to treat the whole woman, and not just her disease.

Boo's Boutique was made possible thanks to generous gifts from the Binswanger family, the Friends of the Hospital of Fox Chase Cancer Center, the Joan Harad Goodis Fund, and Jane Villon in memory of Joyce Clapper, mother of Fox Chase researcher Margie Clapper.

"Surviving cancer matters to us, but quality of life matters to us too. We wanted to provide a space internally for cancer survivors so they could leave Fox Chase with all their needs taken care of."

—BONNIE MILLER, administrative director, Women's Cancer Center

Photos by Neal Santos

The family-owned Jay Ann Intimates is run by Farrell Friedenberg (left) and Randi Denmark, both certified mastectomy fitters. Friedenberg also operates a Jay Ann location in nearby Huntingdon Valley.

"I always take visitors by Boo's Boutique. I'm proud that I work at a place that considers a patient as a person, not just their cancer. This feels like such a holistic and healthy approach."

—GLENN RALL, immunologist and associate chief academic officer

"I've been breast cancer-free for 14 years, but until I came in for a recent six-month checkup, I had no idea these products existed. I feel so much better now."

—DOLORES WOLFF, breast cancer survivor

"Boo's Boutique is a way for us to give back to patients—a little place that's welcoming and makes them comfortable within their Fox Chase home."

—LINDA HAMMELL, director of community cancer screening and president of the Friends of the Hospital of Fox Chase Cancer Center

Kathryn Dollard (left), co-manager of Boo's Boutique and vice president of ways and means of the Friends of the Hospital of Fox Chase Cancer Center, and Linda Hammell (right).

"Randi came looking for me after my surgery. With her help, I look symmetrical and feel balanced. Oh, and the selections! The colors, the designs! So many pretty things! I learned that even after the surgery, I can still be a woman and be pretty."

—TIJUANA TANCEMORE, breast cancer survivor, pictured with Randi Denmark

JOE HURLEY

A DAY IN THE LIFE: NURSE NAVIGATION AT FOX CHASE

LAST NOVEMBER, **the White House invited three of Fox Chase's nurse navigators—** gynecologic oncology navigator Carol Cherry and breast navigators Tracey Newhall and Jessie Schol—to attend a reception in which Dr. Jill Biden, an educator and wife of U.S. Vice President Joe Biden, spoke about the positive impact of navigation on healthcare.

OFFICIAL WHITE HOUSE PHOTO BY DAVID LIENEMANN

Fox Chase has been at the forefront of the nurse navigation movement, launching its formal program four years ago. Today, twelve navigators specialize in a range of cancer types, including breast, gynecologic, thoracic, genitourinary, gastrointestinal, hematologic, and head and neck cancers, along with melanoma and sarcoma.

While the title of nurse navigator has become common nationally, those who hold it vary from professionals with a social work focus to volunteers who help patients find their way to appointments. Fox Chase follows a clinical navigator model, meaning that every nurse navigator is a certified oncology nurse, able to address patients' urgent clinical questions. Patients calling Fox Chase typically have many clinical questions and having a nurse navigator available from the first connection has proven to be invaluable for patients.

What other qualities make nurse navigators so valuable? What do they do on a daily basis?

FOR THE ANSWERS, we followed a day in the life of JOANNE STEIN, a head and neck nurse navigator who has been with the program since its inception. ▶

ABOVE: Fox Chase launched its nurse navigator program four years ago. Today it has twelve nurse navigators, each specializing in a specific cancer.

LEFT: At a White House reception commemorating breast cancer awareness month, Dr. Jill Biden recognized three Fox Chase nurse navigators when speaking about the positive impact of nurse navigators on healthcare.

A TUESDAY AT FOX CHASE CANCER CENTER

5:00 A.M.: I'm up early, and have some oatmeal with my vitamins. On my way in from Lawndale, 10 minutes away, I stop at the Wawa and get a French vanilla coffee.

7:00 A.M.: I park in the East Garage. I like to get in before clinic begins and the phone starts ringing.

7:15 A.M.: I head into the office that I share in the Women's Cancer Center with nurse navigator Kate McFarland. I check my voice mail, emails, and patient schedules for the day. I make sure the chemotherapy schedule is what it should be for the week, schedule radiology tests, and check the three head-and-neck physicians' schedules. I pull the new patient records and pathology reviews and bring them to clinic.

It's our multidisciplinary day—medical oncology, surgical oncology, and radiation oncology are running clinics at the same time. A lot of the head and neck patients need to be seen by all three specialists because they'll require all three treatment modalities. It allows me to meet the new patients. The ones receiving chemotherapy and radiation require a lot of support, and I follow them through the whole continuum of care.

9:00 A.M.: "Donna," 36, married with three kids, has been treated for tongue cancer with surgery, chemotherapy, and radiation. Two years post-treatment, she is back to work at a bank, and her speech is excellent, despite the removal of part of her tongue. When she first came in, she was very distressed. She had gotten an opinion at a New York hospital; met with a team of medical, surgical and radiation oncologists at Fox Chase on the same day; and had another appointment in Philadelphia. She called me back to say she wanted to come to Fox Chase because it felt like home. It's one of the reasons I like my job so much. I got to know her really well, and now she says, "I got through this because you were here."

10:00 A.M.: "Rick," 53, has a large neck mass with a stage 4 tumor, but it's curable. He works as a manager for a communications company, and is concerned about how his disease will affect his quality of life. I schedule him for a PET scan, make sure he has follow-up appointments with the radiation and medical oncologists, arrange for his chemotherapy port and teach him about it, and make sure he understands his chemotherapy schedule. Over the year, he has a robotic tonsillectomy, chemotherapy, and radiation, and is disease-free three years later.

12:00 P.M.: Tuesdays are really busy, so I grab a turkey sandwich that I've brought for lunch with potato chips, fruit, and a soda.

2:00 P.M.: I'm in the new patient clinic with our surgeon, Dr. Ridge. If he gets a referral from a doctor, he asks the patient to contact me. If patients have financial questions, I refer them to the financial counselor. I explain where to park and how to get here from the garage. On the phone before the visit, I ask the patient what's going on, to gauge their understanding of the disease. Most people are grateful that we're reaching out.

3:00 P.M.: I take a call from "Sam," 78, who has a voicebox tumor and multiple co-morbidities: diabetes, heart disease, and vascular disease. He's hoarse and difficult to understand, and isn't sure he wants to be evaluated. I tell him he needs to come in and hear what the doctor has to say, and it'll be his decision whether or not to receive treatment. The older population especially has preconceived notions about how awful cancer treatment can be. He doesn't have a family member to bring him in, so he drives himself. I notify the social worker. I meet him with Dr. Ridge. He's not a candidate for surgery, but has radiation and chemotherapy and a fairly good response.

Treatment for head and neck cancer affects swallowing, and the pain can be intense. Patients need support throughout the process. I refer him to the case management department for home health care.

6:00 P.M.: Clinic is over. On the way home, my mind is reeling. Did I do everything I needed to do? Was everyone scheduled properly? Did I order the patient's pathology slides? I relax after dinner, have a cup of coffee, read the paper, watch a little TV.

WHAT I ENJOY MOST ABOUT BEING A NURSE NAVIGATOR *is building relationships with the patients and their families. We care. Our patients are not transferred to dozens of departments. They know there is one contact person, and we provide easy access to the physicians.*

I'm proud of my colleagues, some of whom have shared their expertise at national meetings. I enjoyed my own speaking engagement in New York City with survivors of oral and head and neck cancer. Our patients seem to bear out our value: retention rates in the head and neck clinical program are between 85 and 90 percent, and our patient satisfaction rate remains consistently at 99 percent or better.

I understand that receiving a cancer diagnosis can be frightening and overwhelming. As navigators, we work to reduce the anxiety of our patients and their loved ones and make sure the cancer journey is as easy to negotiate as possible. My days may be long, but I work hard so that my patients and their families don't have to.

—Joanne Stein

PICTURED BELOW: Joanne Stein (left) with patient Loren Santamaria.

JEFF BAXTER

FOURTH CONSECUTIVE MAGNET DESIGNATION AWARDED TO FOX CHASE NURSES

For the fourth time in a row, Fox Chase has been granted Magnet designation for excellence in nursing services through the American Nurses Credentialing Center's Magnet Recognition Program®—making it the first health care provider in Pennsylvania, and one of only 13 in the nation, to have achieved three successful re-designations. The nation's highest form of recognition for nursing excellence, Magnet designation denotes superior nursing management and practice standards, nursing leadership and support, and attention to cultural and ethnic diversity, and is one of the benchmarks used to measure the quality of patient care.

JOE HURLEY

FOX CHASE AND ITS DOCTORS RANK HIGHLY IN NATION, REGION

Fox Chase is among the top 20 hospitals in the nation for cancer care, according to rankings released in July by *U.S. News & World Report*. Additionally, Fox Chase was ranked as high performing in the areas of nephrology, urology, and gynecology, as well as a new area—ear, nose, and throat.

LISA BAILEY

Fox Chase faculty and staff celebrated the Center's favorable ranking at a special celebration in July.

"Our remarkable standing in this year's *U.S. News & World Report* national ranking reflects not only the hard work and mission-driven mindset of everyone who works at Fox Chase, but illustrates the great strides our Center is making in cancer science and medicine," says Richard I. Fisher, President and CEO.

The rankings take into account a number of factors, including reputation among peers, facilities available, specific services offered, patient safety measures, Magnet nursing status, and selected outcomes metrics.

Locally, *Philadelphia* magazine ranked 28 Fox Chase doctors as among the best in the region in its annual "Top Doctors" issue. The list highlights physicians who are nominated by peers, then screened by physician-led research teams based on criteria such as education and experience. See a list at foxchase.org/topdocs.

A MILESTONE FOR PAIN AND PALLIATIVE CARE

Fox Chase Cancer Center's pain and palliative care program reached an important milestone in April when it received advanced certification from The Joint Commission. The recognition goes to inpatient programs that demonstrate exceptional patient- and family-centered interdisciplinary palliative care. Fox Chase is one of only five facilities in the region to receive this certification.

The Commission's certification is the latest development in what has been a decades-long quest to raise the profile of pain and palliative care and to have the discipline recognized as a distinct and integral component of medical care, explains Michael H. Levy, director of Fox Chase's pain and palliative care program and a leader in developing palliative care guidelines and standards.

INAUGURAL BENEFIT AND WINE AUCTION RAISES FUNDS FOR FOX CHASE

"In Vino Vita!" "In wine, life!" There was plenty of wine—and life—in the grand ballroom of the Ritz-Carlton Philadelphia on May 15 as Fox Chase hosted its inaugural In Vino Vita wine auction and benefit in partnership with the Board of Associates. Nearly 250 people from across the region enjoyed a festive evening to raise funds in support of the leading research and patient care happening at Fox Chase. The event raised a quarter of a million dollars, with a special pledge garnering more than enough for the purchase of 35 state-of-the-art recliners for the infusion room.

The evening also included the presentation of the 2014 Stanley P. Reimann Honor Award, Fox Chase's highest honor, to Nobel Laureate Avram Hershko. A biochemist who is currently on sabbatical at Fox Chase, Hershko shared the 2004 Nobel Prize in Chemistry with biologists Irwin A. Rose and Aaron Ciechanover for their co-discovery of ubiquitin-mediated protein degradation.

Read more about the discovery on page 24.

DANIEL BURKE

The In Vino Vita evening included a live wine auction. Proceeds went toward purchasing 35 state-of-the-art recliners for the infusion room.

CERTIFICATION CONFIRMS BONE MARROW TRANSPLANT EXPERTISE

The Fox Chase-Temple bone marrow transplant program recently earned reaccreditation for three years from the Foundation for the Accreditation of Cellular Therapy (FACT). This achievement affirms the expertise and dedication of the faculty and the high quality of care provided to patients through the hematology program.

HONORS & AWARDS

MICHAEL H. LEVY, vice chair of medical oncology and director of the pain and palliative care program, has been selected by the American Society of Clinical Oncology (ASCO) for its first ever Excellence in Teaching Award. The award, presented during ASCO's 50th Annual Meeting in Chicago in May, underscores ASCO's belief that teaching is as important to the future of cancer medicine as research, care delivery, and clinical work.

ROBERT G. UZZO, chair of the department of surgery, was awarded the 2014 Residents Committee Teaching Award by the American Urological Association at its annual meeting in May. The award goes to an outstanding urology educator or program director who has dedicated a portion of his or her career to teaching residents. This award also recognizes individuals who encourage residents to pursue careers in academic medicine.

SERGEI GRIVENNIKOV, a researcher in Fox Chase's cancer prevention and control program, was awarded the inaugural Landon Foundation-AACR INNOVATOR Award for Research in Tumor Microenvironment. The award, given by the American Association for Cancer Research (AACR), recognizes outstanding achievement by a junior faculty-level scientist and reflects a belief that both the project and the researcher will have significant impact. Grivennikov received the award for his project, "The role and mechanisms of tumor promoting, IL-17 dependent inflammation."

PAUL F. ENGSTROM, acting chair of medical oncology and senior vice president of extramural research programs, was honored with the National Comprehensive Cancer Network's (NCCN) prestigious Rodger Winn Award. The award recognizes Engstrom's role in developing the organization's widely used clinical guidelines. NCCN's CEO, Robert W. Carlson, called Engstrom "the 'father' of the NCCN Clinical Practice Guidelines in Oncology," noting his "demonstrated leadership and dedication to the welfare of patients" and active membership in NCCN since its inception.

HORMOZ EHYA, chief of cytopathology at Fox Chase, received the 2014 L.C. Tao Educator Award during the annual meeting of the United States and Canadian Academy of Pathology in March. The award, presented by the Papanicolaou Society of Cytopathology, cites Ehya's exemplary contributions to cytopathology education.

A **PRIZE-WINNING** QUESTION

IN STUDYING PROTEIN DEATH, FOX CHASE RESEARCHERS BREATHED NEW LIFE INTO CANCER DRUGS

By Katie Derickson

When Israeli biochemist Avram Hershko and his then-graduate student Aaron Ciechanover arrived at Fox Chase in the summer of 1979, the institution was already regarded as a top place for cancer research.

"Fox Chase had five members of the National Academy of Sciences, including a Nobel Laureate, which was remarkable for a relatively small research institution," says Hershko, who found the talented roster of researchers inspiring. He and Ciechanover joined the lab of Fox Chase investigator Irwin A. "Ernie" Rose, where they examined how cells dispose of damaged proteins. Their work laid the foundation for a new class of effective cancer drugs and eventually added Hershko, Ciechanover, and Rose to the ranks of Nobel Prize winners.

During the late 1970s, many scientists were researching how proteins are made within cells. Hershko took a different approach. He began to study the other end of the protein's life cycle—degradation, the process through which cells mark proteins for destruction, then destroy and dispose of them.

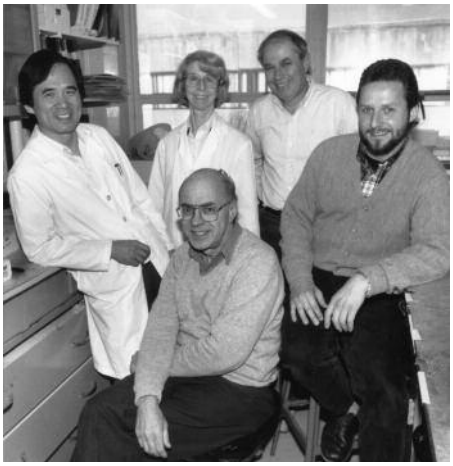
Hershko did not know of anyone else who shared this research interest until he met Rose at a scientific conference at the National Institutes of Health. Much to his surprise, Rose, an expert on enzyme mechanisms, had also been looking into protein degradation. Hershko had been scouting for an appropriate location to spend a sabbatical year, and it seemed he had found the perfect match. He asked to join Rose's lab, and Rose obliged.

Continuing his work on protein degradation at Fox Chase, Hershko, together with Rose and his lab, uncovered the role of a molecule called ubiquitin, which cells use to tag proteins that are defective or no longer needed. Special enzymes attach ubiquitin to these obsolete proteins, flagging them for destruction by the proteasome, the cell's protein garbage disposal. "I remember the moment of great excitement when the results of the experiment came out from the film-developing machine showing that ubiquitin targets proteins for degradation," says Hershko. Ubiquitin became known as the molecular "kiss of death."

"It is my opinion that this is another of the 'rare events' in the history of ICR science."

In decoding this process, Hershko, Rose, Ciechanover, and their colleagues helped future researchers understand how cancers develop when the degradation cycle is disrupted. "The implications are enormous," wrote Alfred Knudson Jr. in 1979 as then-director of the Institute for Cancer Research, the early name for Fox Chase's scientific enterprise. "It is my opinion that this is another of the 'rare events' in the history of ICR science."

The implications of the discovery weren't fully realized until 2003, when a drug came to market that harnessed the power of ubiquitin. Bortezomib, known commercially as Velcade, interferes with the proteasome to help destroy tumors in multiple myeloma, a cancer of the bone marrow. It was the first medication based on the Fox Chase team's research to be approved by the FDA.



FOX CHASE ARCHIVES; FACING PAGE: BRYAN LATHROP

The lab of former Fox Chase investigator Irwin A. "Ernie" Rose (front center) in the late 1970s. Avram Hershko stands in the back row, third from left.

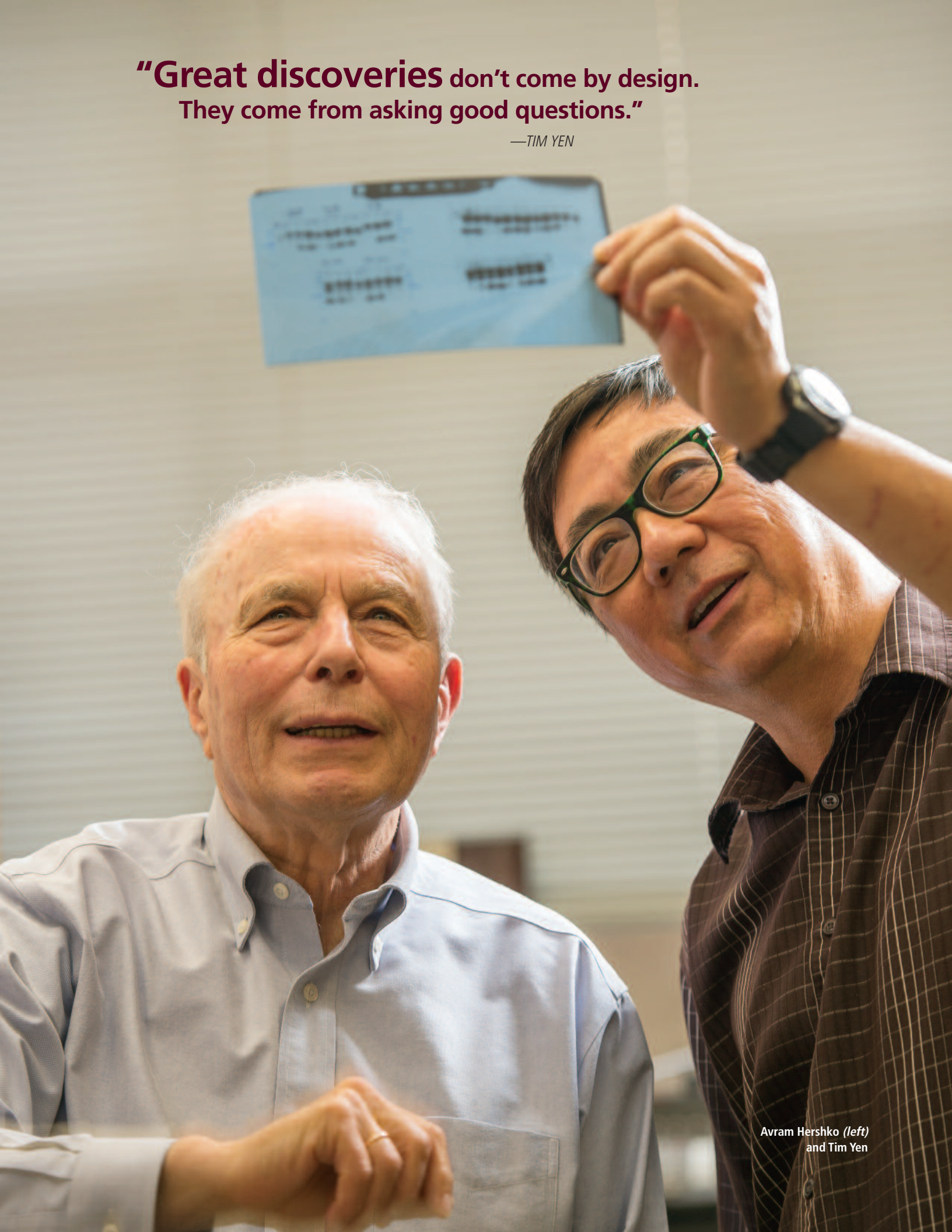
In 2004, Hershko, Ciechanover, and Rose were awarded the Nobel Prize in Chemistry for their work. "It does not mean that a miracle drug to beat cancer is on the way," said Hershko in an interview with the Associated Press in 2004. "But I do believe there will be advances in the treatment of cancer based on our work. This I truly believe in." Since Velcade, several cancer treatment medications based on this research have come to market.

Since the profound success of his first sabbatical at Fox Chase, Hershko has returned several times over the following decades to continue his research on ubiquitin. Together with Fox Chase biochemist Timothy J. Yen, he is currently studying how ubiquitin works in mitosis, the process of cell division. "Someone who has uncontrolled mitosis will have tumors," explains Yen. "Until we understand how a cell regulates cell division correctly, we won't understand how it does it incorrectly, as in the case of cancer."

With 35 years and a Nobel Prize behind him, Hershko, now 76, remains as dedicated to his research as ever. "It takes a lot of hard work, determination, and patience to find the answer to the question," he says. Yen seconds that, citing Hershko's earlier achievements. "Great discoveries don't come by design. They come from asking good questions." ◇

"Great discoveries don't come by design. They come from asking good questions."

—TIM YEN



Avram Hershko *(left)* and Tim Yen

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"PHILADELPHIA: THE CITY OF BROTHERLY LOVE AND THE PHILADELPHIA CHROMOSOME"
is the last work of Elena Gitelson, a Fox Chase-trained medical oncologist who died of pancreatic cancer in 2013. Today, her memory continues to drive her husband, Fox Chase physician-researcher Igor Astsaturov, in his quest to develop better treatments for patients.

Read their story—and that of other Fox Chase faculty touched by cancer—on page 10.

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