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MOFFITT MOMENTUM®

FOOD FOR THOUGHT
Research kitchen opens new possibilities

DIGITIZING PATHOLOGY
New lab revolutionizes patient care and research

STANDING STRONG
Osseointegration surgery changes life for amputee



FABIANA STEWART
Cancer Survivor

Leadership Message



Patrick Hwu, MD
President and CEO

Dear Friends,

One of the most common questions patients ask me is also one of the most difficult to answer: "What should I eat?"

It is an understandable question. Food is part of our daily lives, and after a cancer diagnosis, patients want to know whether the choices they make can help them feel better, respond to treatment or reduce the risk of recurrence.

We have promising ideas, but we still need stronger evidence. Much of what we know about nutrition and cancer has come from retrospective studies that ask people to remember what they ate months or even years earlier. Those studies can offer clues, but they cannot provide precision.

At Moffitt Cancer Center, we are working to change that. The Population Engagement and Research Laboratory (PEARL) kitchen allows our scientists to study nutrition with greater rigor. Researchers can design specific dietary interventions, prepare carefully measured meals and evaluate how those foods affect the body over time. They are studying how dietary patterns may influence inflammation, cognitive function, immune cells, surgical recovery and the gut microbiome.

This work is not about identifying one "miracle" food or a universal cancer diet. It is about generating reliable data so that one day, clinicians can provide more personalized, evidence-based guidance based on a patient's diagnosis, treatment and individual biology.

Nutrition is one piece of that increasingly detailed picture.

Another is the tumor itself. Pathology has always been essential to understanding cancer, but digital pathology is transforming how much we can learn from a tissue sample and how quickly we can learn it. At Moffitt, glass slides are being converted into high-resolution digital images that can be reviewed, shared and analyzed using advanced computational tools. Artificial intelligence can help identify patterns, measure biomarkers and uncover subtle features that may not be visible through a traditional microscope.

The true potential emerges when these different sources of information come together.

Imagine being able to study the foods a patient eats, their microbiome changes, their immune system's behavior, their cancer's molecular features and their tumor's microscopic architecture, not as isolated data points but as parts of one story. That fuller picture can help us understand why one treatment works for one patient but not another, who may be at greater risk of recurrence and which interventions may improve outcomes.

That is the future of personalized cancer care: not one answer for every patient, but better answers for each patient. The stories in this issue of Momentum show that future taking shape across Moffitt. You will read about nutrition studies, digital pathology tools and innovative clinical approaches that adapt care to the individual patient.

These advances may look very different from one another, but they are connected by a shared purpose: turning better information into better decisions for patients.

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Nutrition Knowledge
Empowering patients with research



Digitizing Pathology
Revolutionizing the future of care



Lifechanging Surgery
One powerlifter's story



Fabiana Stewart joined one of Moffitt's nutrition studies after finishing treatment for breast cancer. Participating in the study gave her a sense of direction and support.

FABIANA STEWART
Cancer Survivor

Food *for* Thought

How Moffitt's PEARL Kitchen Is Transforming Cancer Nutrition Research

By Pat Carragher | Photos by Nicholas J. Gould

"What are you going to do for you today to move your life forward?"

The question is written on a dry-erase board in Fabiana Stewart's kitchen.

She changes the message every few days, but that's the one she finds herself returning to most.

On a sunny summer afternoon, Stewart stands at the kitchen counter preparing baked salmon garnished with lemon and sweet potatoes. She chops fresh tomatoes, zucchini and peppers while a pot of quinoa cooks nearby.

The quinoa isn't her favorite side dish, but it has become a staple in her diet.

Just a few years ago, Stewart's meals, and life, looked very different.

The 49-year-old mother of three was born in Brazil. She moved to the United States as a teenager to be closer to her sister. She spent years working in banking before later working with students in local schools and teaching Spanish.

In March 2023, she noticed a lump in her breast.

At first, she wondered if it was a cyst or a symptom of menopause. A mammogram didn't raise concerns, but the lump continued to grow. Months later, she received a diagnosis that would change her life: stage 2B triple-negative breast cancer.

The months that followed were filled with chemotherapy, a double mastectomy, radiation treatments, immunotherapy and clinical trials. Through it all, clinicians at Moffitt Cancer Center guided her every step of the way.

Today, she has no evidence of disease.

"For over two years, I had everybody telling me, 'Follow this, do this, take this,'" Stewart said. "I felt safe because I knew somebody was protecting me. But when everything was over, I was like, 'What do I do now?'"

The answer arrived in an unexpected form: a box of meals delivered to her front door.

Stewart became a participant in MIND-BC, one of several nutrition studies conducted through Moffitt's Population Engagement and Research Laboratory, or PEARL. The study examines whether a dietary pattern known as the MIND diet, a combination of the Mediterranean and DASH diets, can help improve cognitive symptoms often reported by breast cancer survivors.

For Stewart, the study offered more than food.

It offered direction.

A KITCHEN BUILT FOR DISCOVERY

Stewart's meals didn't come from a meal delivery company. They came from Moffitt's PEARL research kitchen.

The facility looks much like a professional kitchen. Chefs prepare meals, ingredients are carefully measured and menus are planned weeks in advance.

But every recipe serves a scientific purpose.

The PEARL Kitchen is one of only a handful of facilities in the nation designed specifically to support nutrition research in cancer. Here, researchers, dietitians and chefs work together to create medically tailored meals that allow scientists to study how dietary patterns may influence cancer risk, treatment outcomes, quality of life and survivorship.



From left: Tiffany Carson, PhD, and Sylvia Crowder, PhD, are pioneering the dietary research being conducted in Moffitt's Population Engagement and Research Laboratory (PEARL) Kitchen.

For years, nutrition has occupied a complicated space in cancer care. Patients often ask what they should eat during treatment, after treatment or to lower their risk of cancer in the future. Yet compared with other areas of medicine, researchers still have relatively few definitive answers.

"Where we are with nutrition research in oncology, we're far behind where we are in other fields like diabetes and kidney disease," said Sylvia Crowder, PhD, a dietary and nutrition expert in Moffitt's Department of Health Outcomes and Behavior. "We have a lot of progress that still needs to be made."

Crowder knows that frustration firsthand. Her interest in nutrition research began in high school after her grandmother, who helped raise her, was diagnosed with cancer. She wanted to play a role in helping her grandmother. That led Crowder to study dietetics, work in clinical nutrition and eventually pursue a career focused on cancer research.

Today, she is among a growing group of Moffitt investigators using the PEARL Kitchen to explore a deceptively simple question: Can food improve cancer outcomes?

The answers are being pursued through a wide range of studies. Some focus on helping breast cancer survivors manage cognitive symptoms after treatment. Others are examining whether specific dietary patterns can influence the gut microbiome, improve surgical recovery or even help prepare patients for advanced cellular therapies such as chimeric antigen receptor T-cell (CAR T) treatment.

"We're able to really be world leaders in how we think about nutrition and oncology outcomes and survivorship," Crowder said.

The growing demand for that research is reshaping the kitchen itself. Moffitt is expanding the PEARL Kitchen into additional space to accommodate more studies, more meal preparation and more investigators interested in incorporating nutrition into cancer research.

For patients like Stewart, however, the impact of the kitchen is measured less in square footage than in something far more personal.

It begins with a meal.

"We're able to really be world leaders in how we think about nutrition and oncology outcomes and survivorship."

- Sylvia Crowder, PhD

FOOD FOR THE MIND

When Stewart enrolled in the MIND-BC study, she wasn't thinking about study design or statistical analysis.

She was thinking about brain fog.

Like many cancer survivors, she found herself struggling with memory lapses and difficulty concentrating after treatment. Simple tasks required more effort. Conversations sometimes slipped away moments after they happened.

"I'm 49 years old, and I'm a very active person," Stewart said. "Everything I have to write down. If I don't write it, I don't remember."

Researchers refer to the phenomenon as cancer-related cognitive impairment, though many patients know it simply as "chemo brain."

The MIND-BC study is testing whether a dietary pattern known as the MIND diet may help address those symptoms. Developed from elements of the Mediterranean and DASH diets, the eating plan emphasizes fruits, vegetables, whole grains, fish, nuts, seeds and healthy fats such as olive oil.

The idea emerged from research showing the MIND diet may help reduce the risk of cognitive decline and dementia. Crowder and her colleagues wondered whether those same benefits might extend to breast cancer survivors experiencing cognitive challenges after treatment.

Participants receive three months of medically tailored meals prepared in the PEARL Kitchen and delivered directly to their homes. They also work with diet coaches who help them learn how to maintain the dietary pattern after meal delivery ends.

For Stewart, the impact extended beyond nutrition.

"I felt like somebody came and hugged me again," she said.

The weekly check-ins, meal deliveries and support provided a sense of structure at a time when she felt adrift after treatment.

That reaction is one Crowder hears often.

"For someone who doesn't have any control on the fact that they were diagnosed with cancer, for them to have this sense of control over one aspect of their cancer journey, I think it's really empowering," she said.

As part of the MIND-BC study, Stewart received three months of medically tailored meals prepared in the PEARL Kitchen and delivered to her home. She also worked with a diet coach to maintain the eating habits.

Researchers are still analyzing data from the study, but participant feedback has been encouraging. Some survivors have even asked whether they could continue receiving the meals after the study ended.

For Stewart, the lessons have remained long after the last delivery arrived.

Rice has largely been replaced by quinoa. Processed foods have become less common. Fish, vegetables and healthier oils now appear regularly on the family's dinner table.

Most importantly, she feels equipped to continue making choices that support her health.

FEEDING THE MICROBIOME

While MIND-BC focuses on the brain, other PEARL Kitchen studies are exploring another rapidly evolving area of cancer research: the gut microbiome.

The human digestive tract is home to trillions of bacteria, fungi and other microorganisms that help regulate digestion, metabolism, immunity and inflammation. Researchers increasingly believe those microbial communities may also influence cancer risk and treatment outcomes.

Tiffany Carson, PhD, a research program lead in the Department of Health Outcomes and Behavior, is leading the DINING study, which examines how the DASH dietary pattern affects the gut microbiome.

The study enrolled approximately 110 participants who were randomly assigned to receive either DASH-based



meals or meals reflecting a more typical American dietary pattern. For five weeks, every meal was prepared through the PEARL Kitchen, allowing researchers to closely monitor dietary intake and study how those differences influenced participants' gut bacteria.

One key focus is dietary fiber.

"We think it helps cultivate a healthier gut microbiome," Carson said.

Although the full analysis is still underway, early findings have been promising. Researchers have observed reductions in certain bacteria that originate in the mouth but can migrate to the gut and have been associated with an increased risk of colorectal cancer.

The findings add to a growing body of evidence suggesting food may influence health in ways that extend far beyond calories or weight.

"People truly believe that what we put in our body and what we eat can impact our health and our outcomes," Crowder said.

Another ongoing effort, the FEED-FF study led by Armen Byrd, PhD, is examining whether fermented foods can influence the gut microbiome and potentially affect treatment responses in patients with colorectal and lung cancers.

Together, the studies reflect a broader shift in how researchers think about nutrition.

Food is no longer viewed simply as fuel. It is increasingly being studied as a complex biological signal that may interact with the immune system, inflammation pathways and the microbiome itself.

PREPARING PATIENTS FOR TREATMENT

Researchers are also asking whether nutrition can help patients before treatment even begins.

Carson's PRIME study focuses on women newly diagnosed with breast cancer. Participants receive Mediterranean diet meals during the weeks leading up to surgery, allowing researchers to evaluate whether dietary changes may improve surgical recovery and longer term outcomes.

"We are providing them with a Mediterranean diet for four weeks," Carson said. "We know from the literature that it leads to lower inflammation and has been associated with better survivorship outcomes."

The concept is known as prehabilitation, helping patients prepare physically before undergoing treatment.

A similar philosophy guided STRONG-PCS, led by Amir Alishahi Tabriz, MD, PhD, which focused on nutritional support for patients undergoing pancreatic cancer surgery. Through personalized guidance and ongoing support, researchers hope to reduce complications and improve recovery for a group of patients particularly vulnerable to malnutrition.

Meanwhile, Crowder is leading another study that combines nutrition with one of the most advanced forms of cancer treatment available today.

The Keto Diet in CAR T study explores whether short-term dietary interventions can improve the fitness of T cells before they are collected and engineered for CAR T-cell therapy.

The idea emerged from laboratory research suggesting ketogenic and fasting-based approaches may strengthen immune cells. Moffitt researchers are now testing whether those findings can translate to patients.

"If Moffitt is one of the world leaders in CAR T, it makes perfect sense for us to be at the forefront of developing not only treatment therapies, but also diet and exercise regimens that might improve outcomes," Crowder said.

Although still in the pilot stage, the study illustrates the breadth of questions researchers can investigate when nutrition science and cancer care intersect.

A GROWING APPETITE FOR DISCOVERY

The success of these studies has created a challenge few researchers would complain about.

Demand.

As more investigators seek to incorporate nutrition into their research, the PEARL Kitchen has reached capacity. Moffitt is expanding the facility, adding preparation space, storage and staffing to support future studies.

The growth reflects a larger transformation underway across cancer research.

For decades, nutrition was often viewed as supportive care, important for overall health but separate from treatment itself. Today, researchers are beginning to ask whether food can become a more active part of the cancer care continuum.

The goal is not to find a miracle food or a universal cancer diet.

"There is not one magic food or one magic dietary pattern that works for everyone," Carson said.

Instead, researchers hope to generate evidence that can help patients and clinicians make more informed decisions about nutrition at every stage of the cancer journey.

For Stewart, that future feels deeply personal.

Back in her kitchen, the salmon is nearly finished. The vegetables are ready. The quinoa is done cooking.

The recipes aren't complicated. But they represent something far bigger than a meal. They represent knowledge. Confidence. Control.

And every time she glances at the message on the dry-erase board, it serves as a reminder of the question she asks herself each day:

What are you going to do for you today to move your life forward?

For now, the answer is waiting on her plate.



The PEARL Kitchen is one of only a handful of facilities in the nation designed specifically to support nutrition research in cancer. From left: PEARL manager Natasha Francis; research chef Russell Clarke; Tiffany Carson, PhD; Sylvia Crowder, PhD; research chef Julissa Graziano; and research chef Richard Postigo.

"There is not one magic food or one magic dietary pattern that works for everyone."

- Tiffany Carson, PhD

NUTRITION AT A GLANCE

MEDITERRANEAN DIET

Inspired by the traditional eating habits of countries bordering the Mediterranean Sea, this diet emphasizes fruits, vegetables, whole grains, beans, nuts, olive oil and fish while limiting processed foods, red meat and added sugars. It has been associated with heart health and lower inflammation.

DASH DIET

Originally developed to help lower blood pressure, the DASH (Dietary Approaches to Stop Hypertension) diet focuses on fruits, vegetables, whole grains, lean proteins and low-fat dairy while limiting sodium, saturated fat and added sugars. Researchers are also studying its potential benefits for gut health and cancer prevention.

MIND DIET

The MIND (Mediterranean-DASH Intervention for Neurodegenerative Delay) diet combines elements of the Mediterranean and DASH diets with a special emphasis on foods linked to brain health, including leafy green vegetables, berries, nuts, olive oil and fish. Moffitt researchers are studying whether it may help reduce cognitive symptoms, often called "chemo brain," in breast cancer survivors.

KETOGENIC DIET

Often called the "keto" diet, this eating pattern is very low in carbohydrates and high in healthy fats. The goal is to shift the body's primary energy source from carbohydrates to fats, producing compounds called ketones. Moffitt researchers are investigating whether a short-term ketogenic diet may help improve T-cell fitness before CAR T-cell therapy.

FERMENTED FOODS

Foods such as yogurt, kefir, kimchi, sauerkraut and kombucha contain beneficial microbes created through fermentation. Researchers are studying whether these foods can influence the gut microbiome and improve treatment response in some patients with cancer.



A Closer Look into the Future

Moffitt's digital and translational pathology programs are transforming how patients are diagnosed and treated, all without the traditional microscope

By Sara Bondell | Photos by Nicholas J. Gould

Long before a patient hears the words "it's cancer," a pathologist has already searched for the answer beneath the microscope.

Under its lens, scattered cells become stories, silent tissues reveal hidden disease, and answers emerge from details too small to see with the naked eye. The instrument is far more than glass and light – it becomes a pathologist's closest partner.

"The identity of the pathologist is tied to the microscope," said William Westra, MD, vice chair of Anatomic Pathology at Moffitt Cancer Center.

So, when Westra was told he may not need his microscope anymore after relying on it for decades, he was resistant.

He had been tasked with ushering in the next generation of disease study called digital pathology. Using large digital scanners instead of a microscope, pathologists can transfer histologic images into high-resolution digital images.

"You might think, well, what's the big deal about that? You're still looking at the same images, but once they're on a computer monitor, you now have this computational platform where you can do all kinds of things," Westra said.

It became a good enough reason for Westra to ditch his microscope and become digital pathology's "biggest cheerleader," as he puts it.

With a digital platform, pathologists can send and receive images from around the world for second opinions and

In Moffitt's digital pathology lab, a digital scanner resembling a robot converts glass slides into high-resolution images in just minutes.

consultations. They can also use artificial intelligence to help make more accurate diagnoses through clinical diagnostic assistance, expedite the triage of patient cases and match patients to specific treatments.

Moffitt has become a leader in the digital pathology space, operating as one of the only major cancer centers to commence the full adoption of the system across the entire institution. The cancer center is currently working to digitize 90% to 95% of all slides to help open the door even further into personalized medicine for patients.

IT STARTS WITH DIGITAL SCANNERS

Moffitt's digital pathology lab currently has nine digital scanners that can convert traditional glass slides into high-resolution images in just minutes by using high throughput technologies.

The machines resemble robots. An automated arm picks up a slide and places it inside the scanner, where a built-in microscope creates a digital image that appears on the scanner's computer monitor. Those images are stored in a digital cloud where they can be accessed by Moffitt pathologists, medical oncologists, surgeons and scientists, as well as shared with other clinicians around the world with just the click of a button. The arm then removes the slide and places it in a storage area for archiving before picking up a new slide to be scanned.

Moffitt partnered with the state this year to secure $2 million to launch the program and will receive an additional $3.7 million over the next year. Those funds are combined with about $15 million pooled together from hundreds of individual donations to Moffitt's Foundation.

The cancer center will generate an estimated 1.7 million glass slides from patient specimens in the lab's first year, with the number of slides increasing 7% to 10% each year.

The digital cloud can currently hold 24 petabytes of data. A petabyte is 1 million gigabytes, and just one petabyte could hold about 250 million photos on a smartphone or store around 1 billion e-books.

With such a high slide volume, Moffitt's initiative to digitize them will be a major time-saver. Traditionally, slides require strict packaging, labeling and careful transportation. Now, they can be analyzed by the scanner in four to five minutes and viewed and shared by pathologists almost instantly.

"From that traditional glass slide practice to the digital platform, we will reduce turnaround time from days and weeks to minutes to hours without losing a single slide," Westra said.

A shorter turnaround benefits patients immensely. A quicker diagnosis means patients get answers faster and can start treatment sooner.

The digital platform also solves practical issues, like the projected shortage of pathologists nationwide over the next few decades while case volumes continue to rise.



William Westra, MD, is spearheading the shift to digital pathology, which will improve diagnostic capabilities and help patients get answers faster.

“From that traditional glass slide practice to the digital platform, we will reduce turnaround time from days and weeks to minutes to hours without losing a single slide.”

- William Westra, MD

“We have begun to use digital pathologists who can work at remote locations, which lets us be more efficient in the demands moving forward,” Westra said.

Sharing information remotely also puts Moffitt in a position to expand its reach to more rural and underserved areas across the state that may have limited diagnostic expertise. Instead of transporting a slide hundreds of miles, the digitized image can quickly and easily be used during a virtual consultation.

“We could provide these healthcare institutions with a digital scanner and train them how to use it, and the images could be sent over digitally and read by pathologists here,” Westra said.

USING AI ALGORITHMS

One of the most important jobs a pathologist has is determining case diagnoses and prognoses. While that has been done with a microscope and the pathologist’s naked eye in the past, digital pathology will use artificial intelligence to increase workflow efficiency and diagnostic accuracy, measure biomarkers, and help predict treatment response.

AI can identify which cases are more advanced and would benefit from earlier treatment, placing those cases at the top of a pathologist’s queue to review. The system can also flag suspicious areas on slides, helping pathologists focus attention on the most important regions first.

Moffitt is now selecting AI algorithms for specific cancer types that can identify subtle patterns that may be more difficult for the human eye to detect, reducing the risk of missed diagnoses and helping standardize interpretations between pathologists. These algorithms can also measure predictive biomarkers – such as HER2 in breast cancer – more consistently, which can help guide treatment decisions.

“Application of the AI-assisted algorithms will allow us to have faster turnaround time and more accurate diagnoses,” Westra said.

‘ULTIMATE LEVEL OF INFORMATION’

Ignacio Wistuba, MD, has also had a front-row seat to the shift away from the microscope. He says he had zero hesitation to embrace the change.

“I am very different. I never liked the microscope,” explained Wistuba, chair of Moffitt’s Translational Pathology Department. “It always felt to me like a black box. Now there is a way to get a more complete and detailed record of what one is looking at.”

Stepping away from his black box and into the digital world has radically changed research capabilities. While about 95% of pathology is dedicated to diagnosing disease, Wistuba says he lives in the other 5%, which is a group of translational pathologists that focuses on discovering the origin of cancer and identifying biomarkers to target.

Translational pathology aims to merge the work between clinicians at the bedside and researchers aiming to find new treatments.

“How can we use human specimens to see what we can learn? For example, we can develop a predictive biomarker – something to tell us how a patient will respond – or a mechanism to improve responses or prevent treatment resistance,” Wistuba said.

While Moffitt is already doing molecular and genomic studies on tumor samples, many answers still may lie in the tissue, such as the architecture and patterns in cells, that can only be analyzed using digital images.

“We can interrogate them to see if they can give us that information that is somehow hidden,” Wistuba said. “By running analyses on the tissue, we can see what we can learn from them and use in the future. That is what I would call the ultimate level of information.”

This work can be applied in clinical trials testing new targeted therapies or combination treatments. Using biopsies and blood tests before and during treatment, translational pathologists can monitor biomarkers on a regular basis to investigate how the patient is responding to treatment. This can help identify early signs of treatment success or failure, which can be used to create predictive biomarkers to help other patients in the future.

BUILDING AI FOR RARE CANCERS

AI also plays a major role in the translational pathology team’s research. The tool will help integrate information from the digital scans with other clinical and molecular data for a large number of cases.

“We will learn from thousands of patients and then develop predictive algorithms,” Wistuba said. “A clinician can see a patient and based on the features of that particular case, predict that the chances of being successful with this treatment is X, or that there are three options and you will respond best to Y treatment.”



Ignacio Wistuba, MD, is chair of Moffitt’s new Translational Pathology Department, which focuses on discovering the origin of cancer and identifying biomarkers to target. Translational pathology aims to merge the work of clinicans at the bedside and scientists researching new treatments.

Using AI to analyze more commonly diagnosed cancers, like breast and prostate cancer, is easier, and there are already AI-assisted algorithms available to help investigate those samples.

Wistuba and his team are setting their sights on rarer cancers, such as neuroendocrine tumors and sarcoma. They are working to develop their own AI algorithms to assist in analyzing digital scans for these rarer diseases more often seen at Moffitt.

“My goal is to start doing clinical trials that are driven by translational studies that can take us to the next level, which is biomarker-driven clinical trials that are novel and can truly change outcomes,” Wistuba said. “And then we plan to take those models and apply them to rare cancers.”

‘ONE-STOP SHOPPING’

Both Westra and Wistuba have spent their careers witnessing the evolution of pathology – from the first sequencing to spatial analyses to now computational and digital pathology. By instituting the Moffitt-wide digitization of slides, pathologists have what Wistuba calls “one-stop shopping,” the ability to analyze samples at every single level.

Moffitt is already focused on the growth of the program. The team plans to add four more digital scanners in the next year to meet increased demand, with one additional scanner for the next five years. Starting at year 6, two new scanners will need to be purchased each year.

Moffitt will also eventually need more digital storage space. The 24-petabyte cloud is expected to be at capacity in about 2 ½ years, and the program will have to continually update the scanners’ software as technology advances over the years.

The future also holds opportunities to use the digital platform for cytology, which focuses on examining individual cells or small clusters of cells to screen for, diagnose or monitor cancer. Those slides will require a three-dimentional scan that will take more time to process and more space to store.

It’s a future that will change patient care and outcomes, and one that most likely will not involve a favorite tool of the past: the microscope.

“We will learn from thousands of patients and then develop predictive algorithms.”

- Ignacio Wistuba, MD



Thinking OUTSIDE THE BOX

Adaptive clinical trial gives earlier stage breast cancer patient chance to pioneer next generation of treatments

By Corrie Benfield Pellegrino | Photos by Nicholas J. Gould

Jenny De Furio was at home with her son and husband when she got the call on May 7, 2024. She grabbed the closest sheet of paper, a piece of engineering paper she would typically use to sketch out diagrams, plot data points and check construction calculations. The project she was about to tackle this time was different, though. Her inputs:

Mass shows invasive ductal carcinoma.

Under 2 centimeters.

“Unlikely” metastatic.

MRI will need to confirm.

Most importantly, she wrote at the top of the paper: * TREATABLE *

De Furio was no stranger to cancer. The structural engineer had been working at Moffitt Cancer Center for just shy of a year as a design and construction project manager. She was managing architects, engineers and contractors to build out the infrastructure needed to support patient care and scientific research.

Still, she didn’t have a strong personal connection to the disease. No family history. No close friends with cancer. When co-workers talked about how everyone has a connection to cancer, she thought: “I’m one of the lucky ones.”

Then she developed a pain in her right breast. It felt like a deep bruise. But there was no lump. No odd discharge. De Furio was 36 at the time and two years postpartum with her second child. She chalked it up to hormones.

When the pain didn’t go away, though, she decided to get checked out. “For peace of mind,” she told herself.

The mammogram showed a mass. The ultrasound signified a problem.

“At the imaging, I could tell the tone had shifted right off the bat, and I felt it in the room,” she remembered.

A biopsy and PET scan finalized her diagnosis: stage 3C, hormone-positive, HER2-negative invasive ductal carcinoma on the right breast.

The mother in De Furio was terrified. Worried for her husband, Anthony, and her little ones, Mary, 5, and Leo, 3. The engineer in her was processing. Gathering every bit of data to calculate the best path forward.

A BLACK BOX SOLUTION

De Furio’s oncologist, Aixa Soyano, MD, walked her through the diagnosis and the treatment options. Considering everything they knew about her type of cancer, the standard of care solution was two blocks of chemotherapy, surgery and radiation.

“I remember the meeting very vividly. She was helping translate my actual diagnosis and she pulled up a PowerPoint,” De Furio said. “And I didn’t realize until then just how prescriptive breast cancer care is. There’s a handful of variables that they get upfront. So, like, what are your tumor

biomarkers? How big is it? How many lymph nodes are suspicious? How old are you? If this, then this; if this, then this. It was like a formula in an Excel spreadsheet."

From there, years of scientific research and patient outcomes predict the best treatment path.

"In my mind, it was very black box, as we call it in engineering," De Furio said. In her field, engineers learn all the calculations that go into solving a structural problem. But in practice, they often can input that data into a computer and rely on it to do the calculations and spit out the solution. There's little visibility into the calculations – thus, the black box. Good engineers are careful to check the calculations, understand the reasoning behind the solution and pivot when there's a better option.

Soyano offered De Furio an option to pivot. After talking through the standard of care, Soyano explained a clinical trial that De Furio was eligible to enroll in. The phase 2 trial, called I-SPY 2.2, treats patients diagnosed with stage 2 or 3 breast cancer using therapies already approved to treat later stage metastatic breast cancer or other types of diseases. After receiving an experimental therapy, the patients may go on to receive the standard of care treatments.

De Furio would need to undergo further testing to collect more information about her type of tumor. She would also be monitored closely throughout the trial with additional imaging to collect data on how the therapy was working. Her treatment plan could change depending on the results of each test. After the experimental treatment, if she still showed signs of disease, she would move on to the standard of care.

De Furio was in.

"The engineer in me just loved everything about this trial," she said. "The way they do it, the data they collect. It turned it into this sense of purpose. They're trying to find out what medications may be even better than this standard of care treatment."

She was excited about the opportunity to think outside the black box.

AN ADAPTIVE TRIAL DESIGN

I-SPY 2.2 is a long-running multicenter clinical trial that began enrolling patients in 2010. Unlike most trials, which evaluate one type of therapy at a time, the I-SPY 2.2 platform trial evaluates multiple lines of experimental therapies at the same time, matching them to patients based on specific testing at enrollment.

Patients who join the I-SPY 2.2 trial start by doing a biopsy to identify tumor biomarkers, a baseline MRI to assess tumor volume and a genomic test called a MammaPrint that determines whether a tumor is high risk or low risk for recurrence.

Based on the data gleaned from these tests, patients are assigned to a line of therapy that shows promise in treating their subtype of cancer. They receive the experimental therapy for 12 weeks, with monitoring at three- to six-week intervals to determine the treatment's effectiveness.

By giving the experimental therapy first, before surgery or traditional chemotherapies, investigators and doctors can monitor its effects on the tumor and make informed decisions on how to proceed. If the patient achieves a complete response at any point, they can move on to surgery and avoid additional unnecessary treatments. If scans show the cancer is progressing, the patient can move on to the next treatment earlier than planned.



When Jenny De Furio was diagnosed with stage 3C breast cancer in 2024, she decided to go on a clinical trial rather than start with the standard of care treatment. She embraced the chance to be part of a more personalized experimental approach.

That adaptive design benefits both the patients and the research as assignments change over time to favor better performing treatment, says Heather Han, MD, director of clinical research in the Breast Oncology Department and principal investigator for the trial at Moffitt. After researchers have collected enough data on a therapy to determine its effectiveness, the treatment can "graduate" from the trial, meaning it shows a high likelihood of success in a future phase 3 trial.

New types of therapies are continually added to the mix, allowing for quicker evaluation of multiple treatments at a time.



Heather Han, MD, is the principal investigator for the I-SPY 2.2 trial at Moffitt, which is evaluating multiple lines of experimental therapies at the same time.

"It's a rapidly evolving system," Han explained. "The design of this clinical trial enables us to constantly assess how patients are doing, and if a treatment is very effective, sometimes we expand. If it's less effective, sometimes we may close it."

Once the patient completes the first block of the experimental treatment, if testing shows a complete response, they can go directly to surgery. If they have not had a complete response, they move on to receive the second block of therapy, which is the standard of care for their cancer type. Ongoing imaging determines whether they go on to receive a third block of standard of care treatment before moving on to surgery.

"That's obviously nice because patients are signed up for something experimental, but you always have access to regular chemotherapy you'd have gotten anyway," Han explained. "We're just saving that for later to let this newer drug have a chance to work, potentially better than standard chemotherapy. The whole goal is to find the better drugs than the current standard of care."

MORE DATA, MORE MONITORING

De Furio's initial tests on the trial gave investigators more information on her tumor subtype. From there, she was assigned to an arm of treatment.

"It's just a deeper dive into what was actually going on in my body and then a more personalized treatment based off of that," she said. "Then, throughout treatment, I got more frequent scans, and so from the engineering side of things, I got to know a lot more upfront, which means I was much more comfortable with what the treatment was and why I was getting it."

Based on De Furio's tumor subtype, she started on trastuzumab deruxtecan, known as Enhertu, a medication that has already been approved by the U.S. Food and Drug Administration to treat HER2-positive and HER2-low metastatic breast cancer. Enhertu is an antibody drug conjugate that targets the HER2 receptors on the surface of cancer cells, delivering chemotherapy directly to those cells as well as nearby cancer cells. Although De Furio's cancer was HER2 negative, the additional testing done as part of the trial indicated that her tumor had enough HER2 expression to give the medication a chance at working.

As part of the experimental treatment, Enhertu was combined with another medication called rilvegostomig, a bispecific antibody that targets two different types of receptors on immune cells at the same time. This dual targeting boosts the immune system to help it recognize and attack the cancer.

De Furio started the first block of treatment on June 18, 2024.

The MRIs showed a significant response. At the end of her 12 weeks on Enhertu and rilvegostomig, De Furio's tumor had shrunk, but she did not have a complete response. That meant she moved on to the second block of the standard of care treatment.

For the next three months, she received Taxol, a traditional type of chemotherapy that damages the cytoskeleton of the cancer cells and stops them from dividing. With imaging still showing signs of her shrunken tumor, De Furio went on to the third block of treatment, two months of AC, a chemotherapy regimen that combines Adriamycin and Cytoxan to attack the DNA of cancer cells and prevent them from replicating.

Although the treatment was grueling, she was motivated by the additional imaging she received that showed her tumor shrinking.

"Because I did I-SPY, I got way more MRIs than a normal standard of care," she said. "So I got to actually watch my cancer go away. I got to see in real time that what I was doing was making an impact."

A COMPLEX OPERATION

Throughout her treatment, De Furio marveled at the fact that she happened to be diagnosed and work at the only cancer center in Florida at the time that offered access to the I-SPY 2.2 trial.

"There are good doctors everywhere, there are talented radiologists everywhere and there are amazing nurses everywhere. But not every institution can put up the gumption to participate in something like this," she said.

Han agrees.

Across the United States, only about 50 locations offer the trial, which is run by a nonprofit consortium called Quantum Leap Healthcare Collaborative. The massive scale of the trial requires a lot of coordination across treatment locations, which are enrolling and monitoring patients, as well as a centralized hub where radiologists and scientists from the consortium are reviewing all the imaging and biopsy results and sending recommendations back to the care teams.

"It's complicated because it requires a lot of multidisciplinary work between radiologists, pathologists, research teams, medical oncologists and surgeons to make all these decisions at multiple points in time," Han explained. "So it's heavily done through major academic centers like Moffitt. It's not yet something that's open to small community practices."

Since its launch in 2010, Quantum Leap reports that I-SPY 2.2 has enrolled 2,800 patients and completed evaluation of 25 therapies. Moffitt has enrolled more than 100 patients since it became a trial site in 2014.

During that time, the efforts have resulted in big strides in treatment of earlier stage breast cancers. The trial has led to three FDA approvals, including that of Keytruda, the innovative immunotherapy that was approved in 2021 to treat patients with high-risk, early-stage triple-negative breast cancer.

Han points out how patients on the I-SPY 2.2 trial had access to that blockbuster medication years before it was approved by the FDA. Moffitt had patients on the experimental medication back in 2015, she notes.

"Now it's a standard of care, but years before the approval, some of our patients already had access to this newer drug," Han said. "So in a way, obviously those patients took a risk, those brave people who signed up for the trial, and some of the patients benefited. That's a successful example that many other drugs could become like that."

'WE'RE STILL LACKING INNOVATION'

Han and Soyano highlight the need for this type of outside the box thinking for patients with earlier stage disease.

"Clinical trials are very much reserved for patients who have stage 4 cancer," Han explained. "It's still a very new concept for early-stage breast cancer patients to sign up for a clinical trial or even to think about it. Because a lot of times, with standard of care, we just tend to continue what's already decided from the beginning."

The black box solution, as De Furio called it.

"Right now, we still use the same chemotherapy regimens that we've used for 20 years, 30 years, 40 years," Soyano said. "We have made big strides in medications in the metastatic setting, and we have multiple FDA approvals over the past five years. But in the early-stage setting, we're still lacking innovation."

Trials like I-SPY 2.2 open the doors for innovation and better outcomes in these patient populations. Still, patients may be hesitant to stray from the norm.

De Furio heard that often from fellow patients when she mentioned she was on the trial.

"With standard of care, you get this concrete plan, and there's a lot of peace in that," she explained. "One woman even said to me, 'That's the tried-and-true approach. Why would I want anything but that?'"

Han and Soyano stress to patients that the therapies being tested in clinical trials are safe and that there's a scientific rationale for using them. They also emphasize the extra layer of monitoring that clinical trial patients receive as part of the process.



"In a clinical trial ... we're trying to incorporate newer research and medications that might be more helpful than the standard of care."

- Aixa Soyano, MD

"In a clinical trial in the early-stage setting, we're being safe, we're trying to be more effective, and we're trying to incorporate newer research and newer medications that might be more helpful than the standard of care," Soyano said. "So it's very important for patients to consider that we can't advance science if we don't use any modern techniques or modern treatment, but it's ultimately up to the patient to decide what's good for them."

'I'M JUST SO GLAD I DID EVERYTHING'

By the time De Furio finished her three blocks of treatment on the trial in January 2025, her cancer had shrunk significantly but had not disappeared.

She went forward with a double mastectomy followed by radiation and then reconstruction surgery. She's now on medication to limit the chance of recurrence.

Looking back, when De Furio signed up for the I-SPY 2.2 trial, she had high hopes that the experimental treatment she received would be the next miracle drug.



De Furio celebrates by ringing the bell with her husband, Anthony, and children, Mary and Leo. De Furio is now back at work and is still contributing to research, this time as a participant in a dietary study for survivors.

"I wanted my story to be that I got this experimental drug through this amazing cancer institution that I also happen to work at. How cool is that? And I'm this miracle case that got four infusions of Enhertu, and my cancer was gone, and then I just got a lumpectomy," she said.

It turns out, De Furio wasn't the miracle case who got to skip the next two blocks of chemo, but she is confident that she benefited significantly from the trial treatment. Data from the arm of the trial she participated in is already showing promising results. Early analysis indicates that treatment beginning with Enhertu in combination with rilvegostomig has shown to be just as effective as the standard of care, with 64% of patients on the phase 2 trial skipping the second block of chemotherapy and 97% avoiding the third block of chemo.

Looking back, De Furio has a different perspective on her longer treatment journey.

"Once you're on the other side, you realize that you would have done anything to kill the cancer," she said. "At least for me, I'm so glad that I went at it with every single thing that may improve my long term outcome, because now, while there are no guarantees, I know that I went at it, not only with standard of care, but also with this new experimental drug. I'm just so glad I did everything. I think I would have so much regret if I didn't."

De Furio is now back at work. Two of her projects involve managing the renovation of spaces where she received treatment just months ago. She has also joined another trial that is evaluating dietary interventions for breast cancer survivors. It is based in the research kitchen she built out as one of her first projects at Moffitt.

Every day, the engineer in her calculates how she is contributing to a better experience for patients. The survivor in her thinks of how her personal contributions to research will benefit the patients of tomorrow. Mostly, she thinks of her own daughter, who will need to start getting mammograms at 26 because of De Furio's diagnosis at 36.

"I'm just so glad I did everything. I think I would have so much regret if I didn't."

"If this is going to be my story, then at least I can know that I played this tiny little role. I'm just one of the many numbers on these trials that is feeding the data that, in one way or another, will make this better," she said. "When my daughter grows up, hopefully she will never have to deal with this, but God forbid she does. At that moment, I would want all the science right now to be the best that it could possibly be. If there's an opportunity to be a guinea pig, I'm here and I'm in."



STANDING STRONG

Innovative osseointegration surgery transforms the way prosthetics work for amputees

By Megan Myers | Photos from Vaughan DeBarr

The gym buzzes with energy. The steady hum of treadmills, the clank of weights meeting metal and the rhythm of music pulsing through the speakers. Amid strangers breaking a sweat, bilateral amputee Vaughan DeBarr stands with help from her two prosthetic legs.

Glancing at the mirrors reflecting the sea of motion around her, DeBarr spots two young men who are focusing on three exercises: the squat, bench press and deadlift. The two young athletes are members of a local powerlifting team.

Curious to learn more, DeBarr asks the men about the sport and shares that it is something she wants to try.

Their immediate response: There's no way she can do it.

Though the interaction lasted only a few minutes, it has stayed with DeBarr. She remembers it clearly because it was the moment she decided, without hesitation, that she would learn the sport of powerlifting.

"I go through life with the mindset that no matter what happens to you, you have two choices: You can either stand up or lie down," DeBarr said. "If you lie down, eventually people are going to start stepping over you and then on you. But if you stand up, you can start moving with the crowd and then moving ahead of the crowd."

> ***"I go through life with the mindset that no matter what happens to you, you have two choices: You can either stand up or lie down."***
>
> *- Vaughan DeBarr*

Now 53, DeBarr reflects on how that mindset took shape early in her life.

At age 7, she was attacked by a dog. The injuries she suffered worsened over time, ultimately leading to the surgical removal of her left leg in 2013 at the age of 40. Seven years later, complications from overcompensation resulted in the amputation of her right leg.

Since then, she has spent years adding extra time to her mornings just to get ready, often budgeting at least an additional half-hour to put on her prosthetic legs.

"It's a whole process when you have sockets," she said. "You must put on a liner, then get the socket on and adjust everything properly. On top of that, there's a very heavy weight to the socket."

While the routine itself was time-consuming, the most difficult part remained the strain on DeBarr's upper body, with each prosthesis weighing about 8 pounds.

That ongoing discomfort eventually led her to explore a procedure that would change the way her prosthetics attach to her limbs.

A BETTER OPTION

Osseointegration is a procedure that attaches a prosthetic limb directly to the remaining bone. Compared to traditional socket-based prosthetics, it can provide more stability, support and functionality for patients.

Moffitt Cancer Center is one of only three centers in Florida offering the Osseoanchored Prostheses for the Rehabilitation of Amputees Implant System – the only bone-anchored prosthesis approved by the U.S. Food and Drug Administration.

Even with modern reconstruction, some patients with cancer ultimately require amputation, explains Alexander Lazarides, MD, an orthopedic oncology surgeon and musculoskeletal oncologist at Moffitt. For patients with sarcoma specifically, 90% receive modern limb salvage surgery and 10% still require amputation.

"This program was especially important at Moffitt because our patients often have complex oncologic histories, including prior surgery, radiation, reconstruction and challenging soft-tissue conditions," he said. "They need a multidisciplinary team that understands both cancer care and highly specialized limb reconstruction."

Because Moffitt is on a short list of centers in the state offering this technology, Lazarides says it was important to provide this procedure to amputees with any etiology, whether oncologic or traumatic.

In 2024, DeBarr was the first patient to undergo the procedure at Moffitt.

A MULTISTEP PROCESS

Osseointegration is completed in phases.

The process begins with the placement of a titanium implant into the patient's remaining bone. During the initial healing phase, the body responds by forming blood clots around



Vaughan DeBarr is the first patient to undergo the osseointegration procedure at Moffitt. The groundbreaking surgical approach attaches a prosthetic limb directly to the patient's remaining bone.



"Our patients often have complex oncologic histories. … They need a multidisciplinary team that understands both cancer care and highly specialized limb reconstruction."

Alexander Lazarides, MD, is an orthopedic oncology surgeon and musculoskeletal oncologist who often works with amputees. Because osseointegration is so specialized, Moffitt offers the procedure to all types of patients, including those who do not have cancer.

the implant site. Over the following three to six months, new bone tissue grows and gradually bonds to the implant, incorporating it into the skeleton.

As healing continues, the bone remodels and strengthens around the implant, creating a stable connection capable of supporting weight and movement. Once the implant is fully integrated, it can be used to support the prosthetic limb.

Patients like DeBarr then participate in 12 weeks of rehabilitation before returning to their normal daily activities with the new prosthesis.

By connecting the prosthesis directly to the bone, it can feel more like an extension of the patient's body.

"For a patient like Vaughan DeBarr, the benefit of osseointegration is not simply that the prosthesis may be a bit lighter," Lazarides said. "It is that she no longer has to carry the additional bulk, pressure, heat and movement of a large socket and suspension system around her residual limb."

WHO IS A GOOD FIT?

Several factors are considered when determining whether a patient is a good fit for osseointegration, including overall health, weight, age and whether the patient is currently undergoing systemic treatments that may increase the risk of infection.

Osseointegration is considered generally effective, with success rates ranging from 80% to 95%, depending on factors such as bone quality and postoperative rehabilitation and care.

Since DeBarr's case, 11 other above-the-knee amputees have undergone the procedure at Moffitt, including four whose amputations were related to cancer.

LIFE AFTER OSSEOINTEGRATION

Now, when DeBarr looks in the mirror at the gym, she doesn't see two young men powerlifting. She sees herself.

Since becoming a bilateral amputee, DeBarr has competed in multiple powerlifting competitions and has no plans to slow down.

The biggest difference since she underwent the osseointegration procedure is how she feels.

"Before this procedure, there was so much weight I had to carry on my upper body, and I was constantly in pain," DeBarr said, noting that her new prosthetics only weigh about 1 ½ pounds each. "Now, it's a lot easier for me to get around, and my upper body isn't constantly in a state of exhaustion. It also only takes me a few seconds to attach my prosthetics in the morning and I'm ready to go."

She also feels that newfound weightlessness in all her other favorite activities, like writing and spending time with loved ones.

She has authored a book about her life journey, hoping to inspire and support others navigating limb loss.

"My biggest passion is helping other amputees in the community," she said. "I like to mentor and talk to them about how they can overcome both the mental and physical aspects of amputation and make sure they have support."

Through her advocacy, DeBarr hopes to show others that challenges do not have to define their future.

"Through my own journey, I have healed from within and learned to love myself the way I am, and that's what I want to encourage others to do," DeBarr said.



"Through my own journey, I have healed from within and learned to love myself the way I am, and that's what I want to encourage others to do."

DeBarr and Lazarides reunite after the successful procedure. DeBarr is a mentor, an advocate and an ongoing source of inspiration for other amputees.

A Chance to Finally *Go Home*

A snowbird stays put in the Sunshine State to receive lifesaving bispecific T-cell engager therapy

By Steve Blanchard | Photos by Nicholas J. Gould

ANTHONY RUSSO
Cancer Survivor



Eileen and Anthony Russo had the option to go home to Massachusetts when he was diagnosed with non-Hodgkin lymphoma. They chose to turn to Moffitt for an innovative immunotherapy.

The Russos just want to go home.

While Anthony Russo and his wife, Eileen, have enjoyed their community in Fort Myers for the past five winters, the Massachusetts natives never expected to spend more than six months at a time in their southern home. Their plans shifted in November 2024 when Anthony, 79, discovered a lump under his arm. Concerned, he visited his primary care provider, who suspected cancer and sent him to a local oncologist.

The oncologist confirmed their fears. Anthony had an aggressive type of non-Hodgkin lymphoma.

"He was going to be on a very aggressive treatment plan," recalled Eileen, who has been diligently caring for Anthony since his diagnosis and said doctors wanted to use chemotherapy and radiation multiple times a week. "He went for one eight-hour treatment, and the following day, when he was supposed to go back, he was sent to the hospital."

When he arrived for his second treatment, Anthony had difficulty breathing. The doctors at the local hospital discovered a blockage in Anthony's heart. He was immediately scheduled for a quintuple bypass, postponing his cancer treatment.

"That delayed everything about six weeks," Eileen said. "His doctor and the cardiologist determined they couldn't go as aggressively as they wanted to with the cancer treatments."

With lower doses of chemotherapy, the cancer treatments continued and Anthony handled them well. Unfortunately, his cancer did not respond to chemotherapy, putting him at very high risk of dying within a few months if the disease remained uncontrolled. At this point, Anthony was weak and, given his multiple complicated medical problems, was not a candidate for further standard aggressive treatment options to cure his cancer.

Anthony's community oncologist recommended the Russos visit Moffitt Cancer Center for a completely different approach.

The Russos again delayed their return to Massachusetts. They remained in Florida and drove to Tampa to meet with the team at Moffitt.

AN IDEAL CANDIDATE FOR BITE THERAPY

The Russos were not familiar with Moffitt prior to his diagnosis and had considered returning home to Boston to seek a new treatment for Anthony. However, after speaking with Sameh Gaballa, MD, a hematologist and medical oncologist in the lymphoma section of the Malignant Hematology Department at Moffitt, they felt like their best option was to stay in the Sunshine State.

They learned the cancer center could administer a novel immunotherapy called bispecific T-cell engager (BiTE) therapy. The innovative immunotherapy directs a patient's own immune cells to target cancer cells with precision and can be administered through an outpatient infusion.

After being monitored on the initial treatments at Moffitt, Anthony could continue receiving the BiTE therapy administered by his local oncologist closer to their home in Fort Myers. Anthony traveled to Moffitt for his first treatment in December.

"Our friends told us, to be honest, that we should go back north and get treatment," Eileen said. "But I thought it was better for him to be down here in the sunshine than being stuck in a house during winter."

Anthony agreed. He also felt like he was in the right hands with his care team in Florida.

"I told my wife, 'Hey, if I'm going to do it, I'm going to stick with these people here.' I told them that whatever they wanted to do, go ahead and do it," Anthony said.

UNDERSTANDING BITE THERAPY VS. CAR T

Immunotherapy takes several forms when it comes to treating cancer. Chimeric antigen receptor T-cell (CAR T) therapy, for example, is commonly used to treat patients with non-Hodgkin lymphoma. It helps reprogram the patients' own immune cells to attack specific cancer cells. But that type of therapy is difficult on the body, requires a lot of time in the hospital and is not recommended for all patients with significant underlying health problems.

"We do a lot of CAR T therapy at Moffitt, but for Anthony, he wasn't a candidate because his medical situation was more complicated," Gaballa said. "He was an ideal candidate for bispecific antibody therapy since the incidence of inflammatory conditions and their severity is much lower."

Cancer patients with challenging health issues are excellent candidates for BiTE therapy because it works differently from CAR T, Gaballa said. Rather than extracting a patient's T cells for reprogramming like in CAR T, BiTE therapy doesn't require cell extraction and reinfusion. Instead, it's an off-the-shelf therapy that is injected into the patient and bonds to individual immune cells.

"While BiTE is inside the body, the therapy acts as kind of a magnet," Gaballa explained. "It pulls your own T cells and attaches them physically to the cancer cells so they can go in and kill it."

The outpatient therapy is used to treat several blood cancers, including acute lymphoblastic leukemia, multiple myeloma, lung cancer and melanoma. There is also promising potential for the therapy to be used in other solid tumor cancers found in the prostate, breast or gastric system, Gaballa said.

At Moffitt, the Specialized Oncology Non-Cellular Immunotherapy Comprehensive Care program, known as SONIC, is a dedicated unit with a specialized team to administer these novel bispecific antibody therapies both in the outpatient and inpatient settings. The SONIC service also enables patients to receive cutting-edge investigational bispecific antibodies on clinical trials for many different types of cancers.

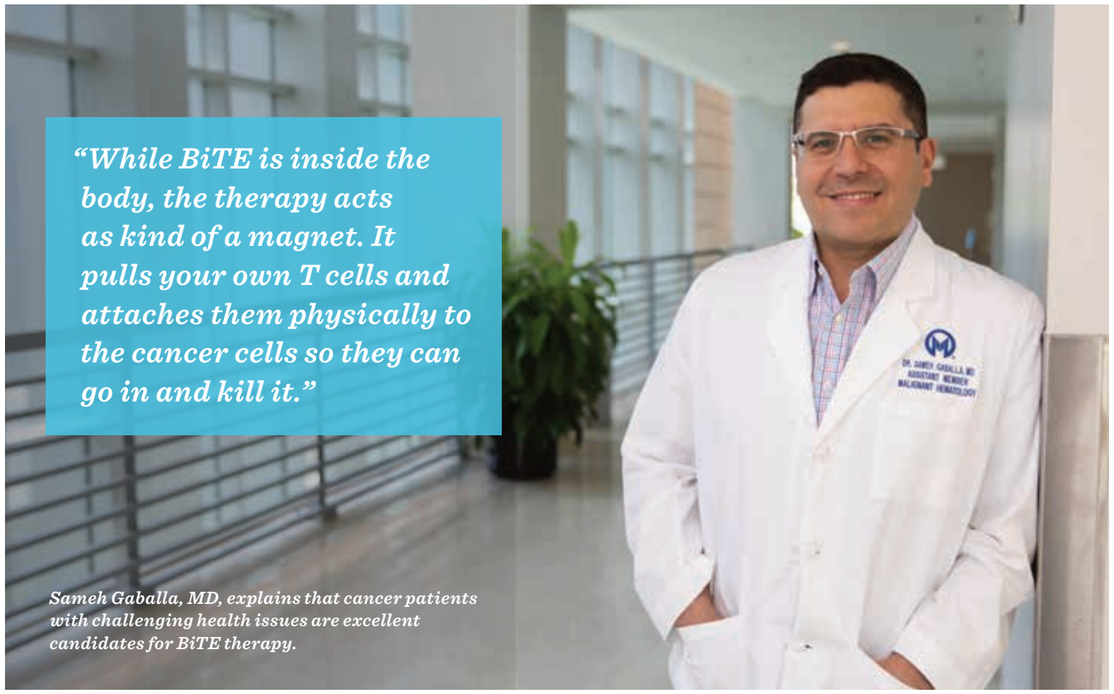
The SONIC service monitors the patients initially and can then coordinate with local oncologists to allow patients to continue BiTE therapy near their home. It's an innovative way to make cancer care more accessible and more convenient. However, patients must stay close to the cancer center for the first two cycles so Moffitt specialists can manage any



Anthony started receiving the BiTE therapy at Moffitt, where he could be closely monitored. Because he responded well to treatment, he was able to transition back to his local oncologist, with support from his Moffitt team.

"I thought it was better for him to be down here in the sunshine than being stuck in a house during winter."

- Eileen Russo



"While BiTE is inside the body, the therapy acts as kind of a magnet. It pulls your own T cells and attaches them physically to the cancer cells so they can go in and kill it."

Sameh Gaballa, MD, explains that cancer patients with challenging health issues are excellent candidates for BiTE therapy.

early side effects.

In Anthony's case, BiTE therapy was combined with Polatuzumab, a targeted cancer therapy used to treat specific types of aggressive non-Hodgkin lymphoma.

To begin his treatment, Anthony and Eileen booked a hotel room near Moffitt as Gaballa and the SONIC team recommended. If Anthony experienced any side effects from the BiTE therapy, Moffitt's team was nearby.

Fortunately for Anthony, his first two treatments were successful and without any uncomfortable side effects.

"None of this has bothered him in the least," Eileen said. "He would drive himself to his appointments if I'd let him."

WORLD-CLASS CARE VIA VIRTUAL MONITORING

Because Anthony's response was so positive, the Russos were able to return to Fort Myers and continue treatments locally. Gaballa worked with Anthony's local oncologist to ensure the BiTE therapy treatments continued successfully, and he checked in regularly on the Russos through video calls. The convenience of local care paired with virtual checkups meant that Anthony could continue to benefit from Moffitt's world-class expertise without spending two hours in the car each way for every infusion.

For six months, Anthony had continued success with the ongoing therapy, which involved a treatment dose every three weeks. He tolerated BiTE therapy well, and the only impact he noticed is a little weakness in his legs and a hit to his social life.

"Before this we were playing shuffleboard and bags," Anthony said. "We were very active."

The couple backed away from social commitments and events in their community during his treatment, simply because they were unsure of how the therapy and his cancer would impact their schedule. Still, Eileen said their southern neighbors have been extremely supportive.

"Everybody prayed for him and dropped by to see how he was doing. Everyone was very concerned," Eileen said. "It's a wonderful community down here where we are."

FINDING THE PATH TO REMISSION

In May 2026, the Russos finally heard the words every cancer patient wants to hear: "You're in complete remission."

Scans showed that Anthony's BiTE therapy was successful, with no indication of non-Hodgkin lymphoma. Part of the success can be credited to Anthony's lack of other extensive therapies preceding BiTE therapy, Gaballa said.

"The earlier you administer BiTE therapy, the better chances for the right outcome," Gaballa explained. In cases like Anthony's, the therapy is only available after other options are exhausted. "So, if you're doing it early on like Anthony did, where there weren't a lot of other therapies involved, you can reach remission."

While remission has always been the goal, Anthony is not yet considered "cured." Gaballa will continue to monitor him every six months with CT scans to check for any disease recurrence.

"Anyone who reaches remission following the full course of treatments will continue to be monitored every six months or so," Gaballa said. "The imaging studies will help us monitor the disease to determine if there is any evidence of recurrence. If it hasn't come back after two years, many patients are considered 'cured' at that point."

THERE'S NO PLACE LIKE HOME

Anthony is almost as excited to return to Massachusetts as he is to be in remission. The former pipefitter and business manager of his local union is looking forward to returning to the home he has shared with his wife for more than 54 years. It's a home he hasn't seen in nearly two years.

"As soon as Dr. Gaballa says it's OK to go home, I'm gone," Anthony laughed. "I know I can't do a lot of the things I used to do because I kind of run out of gas, you know? But we're going to try."

Anthony is thankful for Gaballa and the whole Moffitt team for the treatment he received. In fact, he said he's proud to give the cancer center and the doctor a glowing endorsement.

"I'd recommend him to anybody," Anthony said. "I would tell people from Massachusetts to come down and see him, he's so good!"

Eileen also praises Gaballa and Anthony's medical team of doctors, advanced practice providers and nurses, but she credits Anthony's go-with-the-flow attitude through it all.

"You know, he's made it through all of this and didn't let anything bother him, which was probably a good thing," Eileen said. "His cardiologist thinks he's a miracle."

As the Russos prepare to return to the Northeast, they're excited to explore their options for the future. Will they remain snowbirds, or will they return to Florida full time? They've not decided. But it's a discussion they're looking forward to having soon.

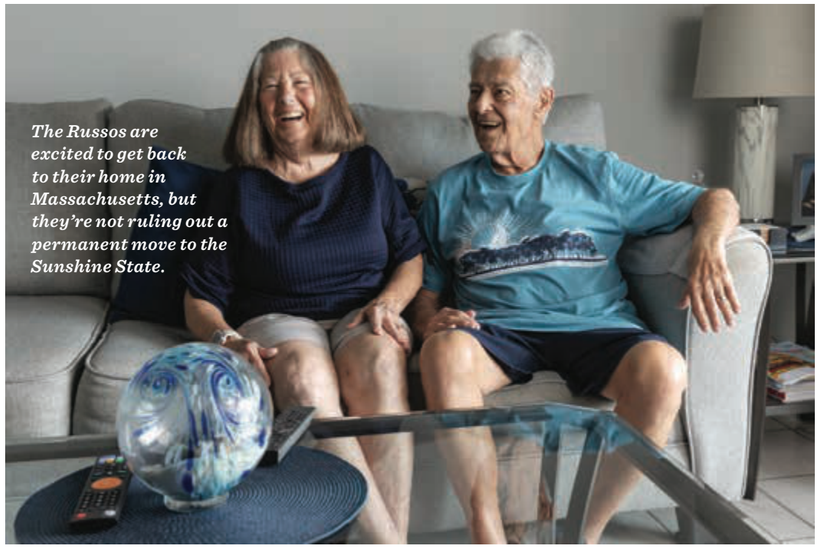
"As far as moving down here permanently, that's something Anthony has wanted to do all along," Eileen said. "I'm the one who was on the fence. But we've enjoyed the weather, the pool, the yard and community here in Fort Myers."

Whatever they decide, they'll decide together. Anthony said he's trusted his wife for more than 50 years to help make the right decisions and guide them, and it was she who asked the right questions to navigate his cancer treatment.

That's something Eileen is quick to confirm.

"Oh yeah, he owes me big time," Eileen laughed. "I remind him of that every day."

"As soon as Dr. Gaballa says it's OK to go home, I'm gone."



The Russos are excited to get back to their home in Massachusetts, but they're not ruling out a permanent move to the Sunshine State.

ABOUT MOFFITT CANCER CENTER

Moffitt Cancer Center in Tampa, Florida, has made a lasting commitment to the prevention and cure of cancer, working tirelessly in the areas of patient care, research and education.

MISSION

To contribute to the prevention and cure of cancer

VISION

Create revolutionary breakthroughs and innovations that rapidly impact and save more lives

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MOFFITT CANCER CENTER

IS MOFFITT CANCER CENTER IN YOUR MEDICARE PLAN'S NETWORK?

Medicare Open Enrollment is here, and health insurance plans can change every year. Now's the time to make sure your Medicare Plan includes access to Moffitt, Florida's top choice for cancer care.

Don't wait! Open Enrollment ends December 7th.

Have questions? We are here to help you understand your current coverage and what a plan change may mean.

Please visit us at **Moffitt.org/OpenEnrollment,**
email FCUinsuranceNavigator@Moffitt.org,
or call 813-745-7300.

Visit Moffitt.org to find out about our upcoming events.

WHEN YOU DONATE TO CANCER RESEARCH your gift will go directly to helping researchers and scientists develop the medicines and protocols that will advance cancer treatments and help cure patients. Simply put, your generosity will help save lives. Every gift, no matter the size, makes a difference. Now is the time to get involved and help make a difference. Visit Moffitt.org/Give to find out more.

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