



Sidney Kimmel Cancer Center at Jefferson

Pioneers and Heroes



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Pioneers & Heroes

Cancer has affected each of us in some way. We've fought and survived cancer, and we've lost loved ones. At the Sidney Kimmel Cancer Center (SKCC) at Jefferson, we believe that every day is one day closer to a cure, with help from hundreds of pioneers at our Center and member Network, and through our heroes, the donors, who refuse to let cancer win.

Each day brings us closer to a cure because we face it with some of the best and brightest in the world – distinguished researchers, radiation oncologists, medical oncologists, surgeons, neurosurgeons, urologists, gastroenterologists and cancer specialists – many of whom are recognized on prestigious lists like Best Doctors in America®.

As a National Cancer Institute (NCI)-designated cancer center – one of only 69 in the nation – we are committed to the continued improvement of outcomes for our patients. We share this commitment with our consortium partners at Drexel University and the Lankenau Institute for Medical Research, and the vast opportunities we collectively have for future discoveries in cancer prevention, diagnosis and treatment. We do what we do, every day, in tandem with 30 members of the Sidney Kimmel Cancer Network. Through our combined efforts we touch the lives of more than 250,000 cancer patients annually, with the opportunity for thousands to participate in breakthrough clinical trials.

We are proud that SKCC is recognized as a *Blue Distinction Center for Complex and Rare Cancers* by the Blue Cross and Blue Shield Association, and that our physicians practice at Thomas Jefferson University Hospitals – ranked by *U.S. News & World Report* among the nation's Best Hospitals for cancer treatment.

For us, it's local. It's global. It's personal. From the generous gift made to our Center by philanthropist Sidney Kimmel, to our pioneering physicians and everyday heroes (our donors), you will see through their eyes, in the pages that follow, how each day...is one day closer to a cure for cancer.

Karen E. Knudsen, PhD

Sidney Kimmel

Investing in the Institution, Cause and City He Loves



In June 2014, Thomas Jefferson University announced the fifth-largest naming gift in American academic medicine history, given by philanthropist Sidney Kimmel to Jefferson Medical College, now known as the Sidney Kimmel Medical College at Thomas Jefferson University, in recognition of this extraordinary gift.

"This \$110 million gift from the Sidney Kimmel Foundation is transformational," remarked President and CEO Stephen K. Klasko, MD, MBA, during the announcement. "It will markedly improve our teaching and learning technologies, provide student scholarship and research support, and position the Sidney Kimmel Medical College at Thomas Jefferson University as a premier and innovative center for medical training and research."

"Mr. Kimmel is investing in our institution and believes in Jefferson enough to put his name on our medical college. His recent and past philanthropic efforts send an amazing signal to others that we're the place they should invest in, too. Our commitment is to make sure that his gifts to Jefferson are the *best* investments he'll ever make."

A Commitment That Began at Jefferson

Mr. Kimmel's relationship with Jefferson dates back to 1996, when he generously donated \$10 million toward cancer research at Thomas Jefferson University – then the largest individual gift Jefferson had ever received. With this remarkable commitment to supporting cancer research, he began his journey to becoming one of the nation's leading individual donors in this area. In honor of his gift to Jefferson, the University renamed its world-renowned National Cancer Institute (NCI)-designated cancer center the Kimmel Cancer Center at Jefferson and more recently amended to become the Sidney Kimmel Cancer Center at Jefferson.

Philly Heart and Soul

Mr. Kimmel became an immensely successful entrepreneur, as founder and chair of the Jones Apparel Group, a leading women's clothing manufacturer. More recently, based in Southern California, he has been a prolific film producer of such box-office hits as *Moneyball*, *The Lincoln Lawyer* and *The Kite Runner*.

Through all of his success and travels, Mr. Kimmel has maintained strong ties with his Philadelphia roots. He has given tens of millions of dollars to such Philadelphia institutions as the National Constitution Center, the National Museum of American Jewish History, the Kimmel Center for the Performing Arts and Jefferson.

"I'm a Philadelphian. My heart has always been here, even though I don't live here now," Mr. Kimmel says. "And I believe that Jefferson is the soul of this city – particularly now, because I sense a new burst of energy with Steve Klasko who is revitalizing this institution."

"It is no secret that we live in a world of change. It is rapid and dramatic. Nowhere is that more so than in health care. I'm delighted to join Jefferson on its transformational ride to the forefront in the delivery of medical education and health care, and to the center of Philadelphia's economic wellbeing. My wife, Caroline, and I are so happy to have our name linked to Jefferson and to be able to make a difference once again in the city that made so much of an impact on me."

We extend our sincerest thanks to Mr. Kimmel for his generosity and his unwavering commitment to Jefferson that span nearly two decades.



Neal Flomenberg, MD

Match Game

Some people take their birthday off. Some spend it doing something special. On September 20, 1995, medical oncologist Neal Flomenberg, MD, spent his birthday on the job, doing something very special – performing the first-ever bone marrow transplant as part of Jefferson’s Bone and Marrow Transplant (BMT) Program – an initiative he and his colleagues established.

Today, Dr. Flomenberg is Chair and Professor of Jefferson’s Department of Medical Oncology, as well as the Sidney Kimmel Cancer Center’s Clinical Deputy Director. This year, his birthday marked the 20th anniversary of Jefferson’s BMT program, and he planned a special celebration.

“We invited all available surviving Jefferson BMT patients and their families,” says Dr. Flomenberg. “We celebrated and drew strength from each other.”

The Region’s Highest Survival Rates

Since its inception, Jefferson’s BMT Program has completed more than 1,000 bone marrow transplants, with increasingly impressive outcomes. These include the region’s highest actual one-year patient survival rates, according to National Marrow Donor Program Center Specific analyses for 2013 and 2014.

Especially remarkable are our outcomes for patients with only half-matched (haploidentical) related donors (usually siblings). Since 2006, Dr. Flomenberg and his team have performed more than 200 transplants on these higher-risk patients utilizing a “two-step” approach they developed over the course of several clinical trials at Jefferson. Patients in these trials who were transplanted while their leukemia was in remission have demonstrated a projected overall survival of 75 percent three years later. In

fact, many of them have survived since 2006, when Jefferson first originated its two-step transplantation.

“Jefferson is the only institution in the nation that’s using the two-step procedure,” says Dr. Flomenberg. “And our outcomes are as good as or even better than anything that’s been published anywhere in the haploidentical transplant field. In fact,” he emphasizes, “half-matched transplants can now generate outcomes that are every bit as good as fully matched transplants.”

The two-step procedure has also benefitted physically fit senior patients who were without a fully matched related donor. In one of the initial trials at Jefferson, the median age of the patient was 67 years, which is far older than most reports of reduced intensity regimens at other institutions.

Modern Family

Human leukocyte antigen (HLA), a protein – or marker – found on most cells in bodies, is used to match patients with donors for blood and marrow transplants. Traditionally, the best transplant outcome occurs when a patient’s HLA and the donor’s HLA fully or closely match. Half of everyone’s HLA markers are inherited from their mothers and half from their fathers. Each brother and sister has a 25 percent, or one in four chance of matching a transplant patient if that patient has the same biological mother and father. The more brothers and sisters with the same mother and father that a patient has, the greater that patient’s chances are of having a suitably matched donor.

“The issue of what to do about patients without fully matched donors has increased significantly since the first bone marrow transplantation in

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— Neal Flomenberg, MD

leukemia patients was reported in 1979,” says Dr. Flomenberg. “Families are becoming more nuclear. The divorce rate is high, the number of single-parent families is growing, and so is the number of patients who have more half-siblings than full siblings. That has driven our development of the two-step approach.”

Timing Is Everything

In traditional bone marrow transplants, patients receive chemotherapy to treat the underlying malignancy before being infused with donor T-cells and then stem cells. The patients receive immune suppressive drugs to prevent graft-versus-host disease (GVHD), a life-threatening complication after transplant. This can weaken the patient’s immune system, which may cause infections and even secondary cancers.

In the BMT approach developed at Jefferson, however, chemotherapy drugs are administered after the introduction of T-cells but before stem cells. This alteration in timing kills GVHD cells but spares cells that restore normal bone marrow function.

“The beauty of this approach is that it’s within every institution’s grasp, regardless of its access to advanced technologies,” Dr. Flomenberg notes. “All we’ve really altered is the timing of the application of chemotherapy. The other advantage, of course, is that it increases the number of potential candidates for successful transplants.”

From Vanilla to Chocolate Chip

The two-step procedure for blood and marrow transplants is a quintessential example of a promising new cancer treatment developed by Jefferson physicians and scientists through a series of clinical trials. Dr. Flomenberg and his team are currently performing additional clinical trials to try out variations that may further improve the two-step approach. For example, they’re currently investigating whether waiting a bit longer following chemotherapy before transplanting immune stem cells might be advantageous in terms of killing off more cancer cells and reducing the chances of relapse after transplant. In the future, more effective drugs



for chemotherapy may be introduced. But these are incremental tweaks, he insists – the fundamentals of the procedure are set.

“A good clinical trial to me is like chocolate chip ice cream,” suggests Dr. Flomenberg. “Standard treatment is like vanilla; a trial is mostly vanilla, but as we go along, we tweak the procedure just a little bit, like adding chocolate chips to vanilla ice cream. It’s not a radical change in treatment, like going from vanilla to say, tutti-frutti. It’s a subtle change. So, our patients certainly need not fear clinical trials, which we generally conduct to test thoughtful and incremental changes to a proven therapy.”

Dr. Flomenberg’s 20th anniversary reunion party for Jefferson’s BMT program was a great success.

“We celebrated with patients and their families that we have been able to help and honored the memory of those who played such heroic roles in making longer survival rates possible for so many. It was the best birthday present I ever received.”

One Size Does Not Fit All

Jefferson offers genomically-informed therapy for individual patients

In Greek mythology, evil Procrustes lured weary travelers with the promise of a perfectly sized bed. Surprisingly, no one was an exact fit, so he made *them* fit the bed instead of vice versa, either by stretching or removing their legs!

Until recently, suggests Stephen Peiper, MD, the Peter A. Herbut Professor and Chair of Jefferson's Department of Pathology, Anatomy and Cell Biology, cancer treatment was a "Procrustean bed," administered arbitrarily. But the past several years have seen the dawn of precision – or genomically-informed medicine – which is profoundly changing how we treat cancer.

"By combining genomic data with bioinformatics and clinical knowledge," explains Dr. Peiper, "the Sidney Kimmel Cancer Center at Jefferson identifies suitable, effective therapy personalized to the genetic blueprint of an individual patient's tumor. Instead of a cookie-cutter approach to treatment, we apply genomics testing to give patients an accurate assessment of their individual disease risk and biology and then select the best options earlier in their care."

Melanoma Activation

"When it comes to providing more precise and personalized therapy," notes Dr. Peiper, "we need modern and advanced tests because every tumor is different."

For example, Jefferson was the first academic medical center in the U.S. to offer the FDA-approved diagnostic assay that tests melanoma patients for the BRAF mutation (which occurs in about half of all cases) and ultimately determines if they'll benefit from taking the oral drug vemurafenib. Both the drug and its companion diagnostic test were developed by Roche Pharmaceuticals and approved in 2011 by the FDA after clinical trials showed that this medication significantly extended survival *only* in metastatic melanoma patients with the BRAF mutation.

"Melanoma is a deadly skin cancer, and the BRAF mutation test plays a pivotal role in our approach to it," says Dr. Peiper. "It allows us to quickly and accurately identify Jefferson patients who will respond positively to vemurafenib."

Targeting Lung Cancer

Similarly, testing patients with non-small-cell lung cancer for the presence of certain somatic mutations, or genetic changes in their tumors, can help doctors select the right treatment with the best chance of success. Jefferson offers two such tests. One test identifies patients with mutations in the epidermal growth factor receptor (EGFR) gene who may respond positively to and benefit from the medications erlotinib and gefitinib. The other test reveals anaplastic lymphoma kinase (ALK) mutations, for which the chemotherapy drug crizotinib can be a lifesaver.

Prognosticating Breast Cancer

In October 2014, Jefferson became the first academic medical center in the region, and one in a small, elite group in the nation, to perform the Prosigna™ Breast Cancer Prognostic Gene Signature Assay.

Prosigna uses a patient's tumor resection and analyzes its genomic expression signature for 50 genes important to breast cancer growth and spread. It determines how much of each gene is expressed as RNA by the cancer, which helps predict whether the cancer is aggressive or not. The Prosigna software then combines the data from the genomic expression signature with information from a surgical pathologist about the size of the tumor and whether the lymph nodes are involved, in order to determine risk of recurrence.

“Instead of a cookie-cutter approach to treatment, we apply genomics testing to give patients an accurate assessment of their individual disease risk and biology and then select the best options earlier in their care.”

— Stephen Peiper, MD



Stephen Peiper, MD

“Prosigna enables us to grasp quickly how threatening the disease is and how likely it is to recur, so we can prescribe a course of treatment that is most likely to succeed,” says Dr. Peiper. “Being able to perform it here in Jefferson’s Molecular & Genomic Pathology Laboratory significantly reduces turn-around time for test results, allowing patients to begin effective treatment sooner.”

More to Come

Dr. Peiper adds, “We have put together a great team in clinical genomic oncology that will provide Jefferson oncologists with diagnostic information that offers a new approach to clinical trials. Therapy in these so-called ‘basket trials’ consists of agents targeted to specific genetic mutations that drive tumor behavior instead of the site of origin.”

Also, in collaboration with Foundation Medicine, SKCC is a founding member of Precision Medicine Exchange Consortium (PMEC) which brings together oncology thought leaders from academic medical centers, regional hospital systems and community oncology networks who share a vision for using precision medicine to improve clinical outcomes in oncology treatment. This consortium offers SKCC access to national genomic sequencing data for a subset of patients with solid tumors, as well as research focused on targeted therapies across various cancer types.

Jefferson’s alliance with Foundation Medicine, supported with the robust expertise and technology available in SKCC’s Genomics Pathology and Cancer Genomics laboratories, will provide our patients access to breakthrough clinical trials, research and therapies that deliver the best-informed care plans possible. It also enables us to use the data we collect about their disease to find and test new ideas for cancer treatments and personalized care.

With advanced DNA analysis and the power of a national genomics consortium and associated clinical trials, Sidney Kimmel Cancer Center at Jefferson is personalizing today’s cancer treatments and advancing tomorrow’s cures.

“Yesterday I dared to struggle.
Today I dare to win.”

— Bernadette Devlin

*Civil rights activist and the youngest woman
elected to the British Parliament*

Sidney Kimmel Cancer Network members include:

- Aria Health
- Brandywine Hospital
- Delta Medix
- Easton Hospital
- Einstein Medical Center Philadelphia
- Hematology & Oncology Associates of Northeastern PA PC
- Holy Redeemer Hospital
- Hudson Valley Oncology Associates
- Inspira Medical Center Vineland
- Inspira Medical Center Woodbury
- Jefferson Hospital for Neuroscience
- Jennersville Regional Hospital
- Mercy Fitzgerald Hospital
- Mercy Philadelphia Hospital
- Mercy Suburban Hospital
- Jefferson’s Methodist Hospital
- Nazareth Hospital
- Nazha Cancer Center
- Nemours/Alfred I. DuPont Hospital for Children
- Northeast Radiation Oncology Center
- Pocono Medical Center
- Reading Hospital
- Riddle Hospital
- Sacred Heart Hospital
- Sidney Kimmel Cancer Center at Jefferson
- Sparta Cancer Treatment Center
- Saint Francis Hospital (Wilmington)
- St. Francis Medical Center
- Trinitas Regional Medical Center
- Wills Eye



**Sidney Kimmel
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at Jefferson**
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