

LANKENAU INSTITUTE FOR MEDICAL RESEARCH

CATALYST

FALL 2021-WINTER 2022



BACK IN LIFE'S FLOW

Trials providing increased options against heart valve disease | [Pages 3 & 4](#)

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Main Line Health clinical professionals invent innovative solutions to improve patient care

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A pioneer in minimally invasive colorectal cancer surgery

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George C. Prendergast, PhD

*The Havens Chair for Biomedical Research
President and CEO
Lankenau Institute for Medical Research,
Main Line Health*

Using new technologies, elite physicians transform heart care

In 1990, pioneering cardiologist Peter Kowey, MD, came to Lankenau Medical Center at Main Line Health, where he spearheaded the growth of a world-class cardiovascular program that included research and education alongside patient care. Under his leadership, patients came to Lankenau knowing they would receive elite-level care in a heart center where research was a top priority. Since then, studies have shown the best health care is found at hospitals that conduct research. We were fortunate Dr. Kowey and other Lankenau leaders understood this connection before it was firmly established.

This tradition is now deepening with a transformative change in cardiovascular research that goes beyond anything I've seen since coming to the Lankenau Institute for Medical Research (LIMR) in 2004. Recruitment of new leaders in cardiology and cardiothoracic surgery who are deeply engaged in research has created a powerful ripple effect, attracting even more talent and elevating the standing of LIMR in the process. Specifically, the advancement of Dr. Kowey's legacy centers on William A. Gray, MD, and Basel Ramlawi, MD, co-directors of the Lankenau Heart Institute and professors on LIMR's resident faculty.

The 2016 recruitment of Dr. Gray, one of the nation's foremost experts in interventional cardiology, marked the beginning of this transition. As Chief of Cardiovascular Services at Main Line Health, Dr. Gray has served as principal investigator for more than 50 clinical trials, including a recent trial specializing in a mitral valve repair device called the MitraClip™.

Dr. Gray brought the U.S. Food and Drug Administration's Early Feasibility Studies program to Lankenau, making it one of a handful of sites in the nation to conduct first-in-human clinical studies of the most advanced new technologies.

As seen in our cover story, leading academic centers refer patients here to gain access not only to top-flight standards of care, but also the latest life-saving technologies being developed by LIMR at Lankenau Heart Institute.

Last year, Dr. Ramlawi arrived as Chief of Cardiothoracic Surgery to provide Lankenau Heart Institute an unsurpassed leadership duo. Dr. Ramlawi is among the nation's top cardiac investigators. Through clinical trials, he is involved in all phases of research and development via the implantation of new and approved valves. Along with complex valve repair, he specializes in aortic surgery and surgical procedures to treat arrhythmias.

Under Drs. Gray and Ramlawi, the goal has been to treat patients with minimally invasive procedures, where recoveries are fastest. That's a future goal for heart care across the nation that is here at Lankenau Heart Institute.

Most exciting is how research by Drs. Gray and Ramlawi is helping attract additional leaders in cardiac care and research. Ali Keramati, MD, is a top electrophysiologist, specializing in all aspects of arrhythmia evaluation and management. Gianluca Torregrossa, MD, serves as Lankenau Heart Institute's Director of Robotic Coronary Revascularization, specializing in robot-assisted coronary artery bypass surgery and hybrid revascularization—an approach joining traditional and minimally invasive robotic methods. Michel Pompeu Sá, MD, MSc, PhD, is a skilled surgeon and cardiac researcher who also has authored or coauthored more than 100 publications in peer-reviewed journals.

I hope you enjoy reading about these researchers and others in this issue of Catalyst. ✨



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About Lankenau Institute for Medical Research (LIMR)

LIMR is a nonprofit biomedical research institute located on the campus of Lankenau Medical Center and is part of Main Line Health. Founded in 1927, LIMR's mission is to improve human health and well-being. Faculty and staff are devoted to advancing innovative new approaches to formidable medical challenges, including cancer, cardiovascular disease, gastrointestinal disorders, autoimmune diseases and regenerative medicine, as well as population health. LIMR's principal investigators conduct basic, preclinical and translational research, using their findings to explore ways to improve disease detection, diagnosis, treatment and prevention. They are committed to extending the boundaries of human health through technology transfer and training of the next generation of scientists and physicians. For more information, visit limr.org.

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WATCH THE VIDEO: To learn more about this story, scan the QR code.

Main Line Health clinical professionals invent innovative solutions to improve patient care



Barbara Wadsworth, Chief Operating Officer and Chief Nursing Officer, invented her own fall injury-prevention device.

“Once a nurse, always a nurse,” Barbara Wadsworth says. So even though she has multiple job titles at Main Line Health, it’s her 35 years of experience tending to patients that guides her decision-making. “I love being a nurse,” Wadsworth says. “The only reason to be the chief nursing officer is to be able to do more good for more people. So when I think about how we can improve

patient care, I turn to our staff for suggestions too. We identified ideas from our bedside nurses for devices they wish they had to help care for their patients.”

Devices and software conceived by Wadsworth and fellow staff members across Main Line Health are being developed and commercialized by a joint venture called Lankenau Ventures—formed by LIMR, Early Charm Ventures and L2C Partners. Lankenau Ventures’ efforts complement LIMR’s continuing acapreneurial™ (academic/entrepreneurial) efforts to license biotech developments, drug candidates and blood assays developed by Main Line Health employees and spin-off companies to develop them.

When asked for ideas, Wadsworth’s thoughts turned toward fall prevention. Main Line Health is among the leaders in the nation in preventing patient falls that result in significant injury, with five or less per 1,000 patients annually. But when falls do happen, the consequences can be serious. Studies indicate patients age 65 and over who fracture their hip have a 50% mortality rate over 12 months.

She came up with a fall injury-prevention device that consists of a portable airbag/cushion-deployment mechanism with a sensor to detect if a patient is falling. The compact device could be mounted in the bathroom or other high-risk areas for falls.

Nurse Colleen Rogers frequently has cared for diabetic patients too weak to lift their leg to allow her to change the dressing on foot or limb wounds by herself. She wondered why there wasn’t a device to cradle the limb instead of having to find another nurse to hold it up. She came up with an idea for a simple-to-operate, adjustable limb support device.

Michelle Gray, a former longtime nurse at Paoli Hospital who now works in Information Technology, thought of the frustration of trying to care for a mother and baby but having to spend time tediously creating separate electronic charts for each of them. She came up with shared electronic medical records software that allows data entered into one chart to be autopopulated in the other while still meeting privacy regulations. *



Betty Jeanne Turgeon shows William Gray, MD, an autographed photo with Yankees’ Hall of Famer Mariano Rivera. Dr. Gray performed life-saving surgery as part of a clinical trial, enabling her to get back to driving to spring training. Right, clinical research nurse Sherry McDermott.

Back in life’s flow

TRIALS PROVIDE INCREASED OPTIONS TO TREAT HEART VALVE DISEASE

Betty Jeanne Turgeon was a rarity when she received a bachelor’s degree in nursing seven decades ago and went on to a long, rewarding bedside career. So Turgeon, a Harrisburg resident, fully grasped the grimness of her prognosis in the summer of 2019 when she was diagnosed with heart failure from a failing and leaky tricuspid valve—a condition known as functional tricuspid regurgitation. Because of it, she could barely shower or get dressed without severe exhaustion.

When her daughter took her to see a cardiologist at a major Philadelphia academic medical center, he had no treatment option to offer her. But he had heard of a clinical trial that might provide one last chance. The trial was being conducted by William Gray, MD, Chief of Cardiovascular Services at Main Line Health, co-director of Lankenau Heart Institute and a LIMR professor.

“I was very, very sick,” she says. “I knew my options were limited and I had to take the chance.”

Turgeon proved to be a candidate, and in November 2019, Dr. Gray performed a minimally invasive procedure that made her among the first to undergo tricuspid valve reconstruction with the Cardioband system. She improved quickly, regained her energy, and soon was able to resume daily activities.

“I was feeling well and in February 2020 drove to Tampa, Florida, for the New York Yankees’ spring training,” says Turgeon, who will turn 93 this Christmas. “I’m a diehard Yankees fan. My beau, Joe, and I go down for a month. And I do the driving, because I have a bigger and nicer car.”

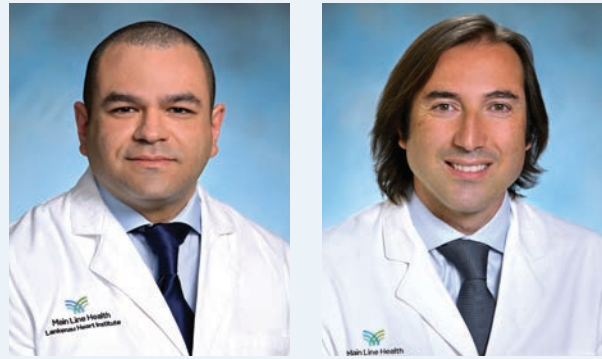
Crucial to catch early

The causes of valvular heart disease range from age-related degeneration to congenital defects present from birth.

“Valve disease, if gone untreated, may not be reversible,” says Basel Ramlawi, MD, Chief of Cardiothoracic Surgery at Main Line Health, co-director of Lankenau Heart Institute and a LIMR professor. “Damage to the heart muscle may follow, which can lead to heart failure and sudden cardiac arrest. But if it’s caught early, valvular repair can often return patients to their expected lifespan without symptoms.”

The purpose of the heart valves is to maintain a one-way flow of blood and prevent it from leaking backward or regurgitating. If a valve fails, the heart begins to work harder than it should, and one may experience shortness of breath and fatigue, and fluid can accumulate in the lungs, liver, legs and feet.

[continued on next page](#)



Michel Pompeu Sá, MD (left), and Gianluca Torregrossa, MD

High-powered boost arrives for cardiac research capabilities

When Basel Ramlawi, MD, arrived at Main Line Health in 2020 to become Chief of Cardiac Surgery and co-director of Lankenau Heart Institute, he aimed beyond providing the highest levels of heart care. In his additional role as LIMR professor, he wanted to expand the system's research capabilities, benefiting not only Main Line Health but the field of cardiac surgery itself.

With the hiring of Gianluca Torregrossa, MD, and Michel Pompeu Sá, MD, he has brought a pair of high-powered minds to achieve just that.

Dr. Torregrossa is the institute's new Director of Robotic Coronary Revascularization and LIMR's newest clinical associate professor. He is originally from Italy and most recently served on the faculty at Mount Sinai St. Luke's Hospital (now Mount Sinai Morningside) in New York. He specializes in robotic-assisted coronary artery bypass graft surgery and hybrid revascularization—an approach to bypass surgery joining traditional and robotic methods.

Dr. Pompeu Sá joins LIMR as a research assistant professor after holding the same title at the University of Pernambuco in Brazil. He is a skilled academic cardiovascular surgeon as well as author and coauthor of over 100 publications in peer-reviewed journals.

COVER STORY

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A portfolio of cutting-edge clinical trials

"Lankenau Heart Institute and LIMR physician researchers work together to offer one of the largest portfolios of innovative and minimally invasive valve repair options," Dr. Ramlawi says. "Many of our investigators are national and international leaders in the field of minimally invasive valve repair."

Among them is Dr. Gray, one of the nation's foremost experts in interventional cardiology. He has served as principal investigator for more than 50 clinical trials, including a mitral valve repair device called the MitraClip™.

In recent years, Dr. Gray brought the Food and Drug Administration's Early Feasibility Studies (EFS) program to Lankenau Heart Institute, making it one of a handful of sites in the nation to conduct first-in-human clinical research. Dr. Gray is the lead investigator of three EFS trials, including the Cardioband trial.

"After much development and testing, clinical trials are the final common pathway for how medical and surgical devices get approved by the FDA," Dr. Gray says. "Patients are participating in the earliest experience with the device, the vast majority of which are ultimately approved as safe and effective and made available to the larger population of patients in need. So by participating in a clinical trial, patients get earliest possible access to these cutting-edge devices."

A widening array of valve-repair options

Lankenau Heart Institute is focused on expanding the use of minimally invasive approaches such as transcatheter valve repair or replacement. Dr. Ramlawi is among the nation's top investigators, involved in all phases of development through the implantation of new and approved valves through clinical trials.

"Our goal is to treat every patient with minimal surgical intervention. And that's not commonplace at many institutions. In fact it's a very distinct capability we offer," Dr. Gray says.

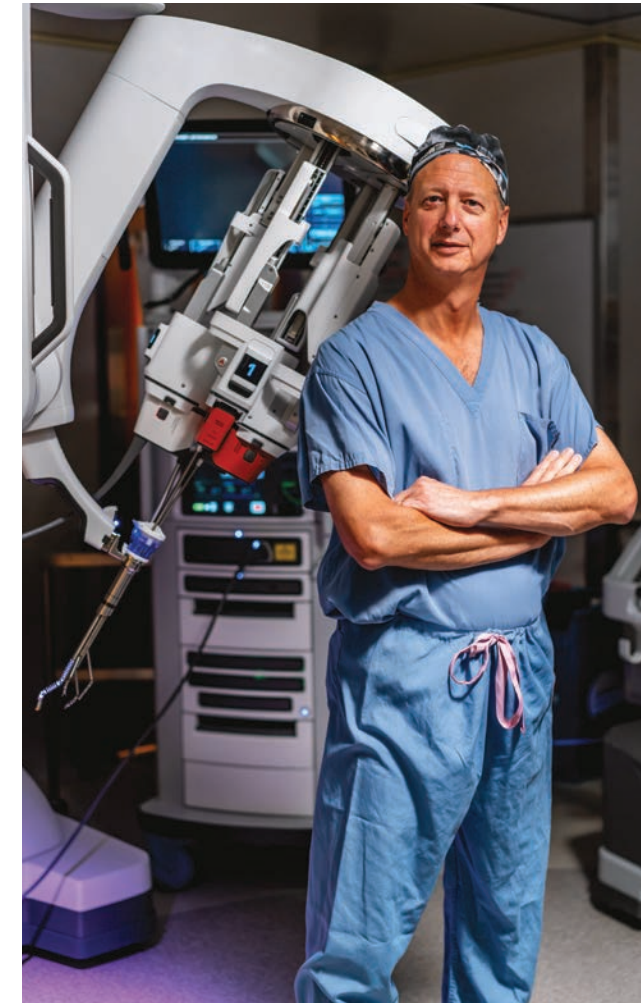
Lankenau Heart Institute's sophisticated team of cardiovascular specialists performs more valve procedures than 90% of other centers in the nation, positioning it as a referral center for conditions that have been deemed untreatable. Global recognition of this expertise has brought program growth, along with an expansion of clinical trials, leading to excellence in care for patients. ✨

SURGICAL ADVANCES

A pioneer in minimally invasive colorectal cancer surgery

John Marks, MD, is always pushing the boundaries of what's possible in treating colon and rectal cancer, using the most advanced techniques to give patients the best possible quality of life.

Dr. Marks, Chief of Colorectal Surgery for Main Line Health and LIMR professor, now plays an integral role in the development of the most advanced minimally invasive approach to colorectal cancer treatment—the new single-port (SP) robotic surgery platform. Robotic arms with cutting tools and a camera run through the SP platform's single one-inch tube. The surgeon can remove cancerous tissues by entering the body with one tiny incision through the belly button, or no incision at all.



"We're able to use the SP robot to perform transanal excision," Dr. Marks says. "This enables us to remove the cancer without any abdominal incision and preserve the patient's sphincter function to avoid a permanent colostomy bag."

Upon the SP platform's 2018 release, Dr. Marks became the first in the United States to perform colorectal surgery using the robot.

During the device's FDA approval process for colorectal surgery, Dr. Marks' team at Lankenau Medical Center is able to use the robot through a research protocol. Dr. Marks has performed the largest number of SP colorectal surgeries in the world and authored a vast majority of research papers in publication. "At this point, using the SP robot has really become our standard approach," he says.

Dr. Marks has been at the forefront of a procedure called transanal total mesorectal excision (taTME), based on a trial of his original work with laparoscopic transanal abdominal/transanal radical proctosigmoidectomy (TATA). His experience in advanced rectal cancer surgery led to Lankenau's 2018 selection to participate in a five-year multicenter taTME trial. Both TATA and taTME are now being performed using the SP robot.

Giving patients the most advanced surgical options has been a family affair. Dr. Marks' father and mentor, Gerald J. Marks, MD, used his own money to purchase the first flexible model colonoscope in the United States. He pioneered the TATA surgical procedure as a way to preserve sphincter function. It has been expanded upon by Dr. John Marks and his team at Main Line Health.

"The rate of people needing permanent colostomy in America is somewhere around 20–40%," Dr. Marks says. "Here at Lankenau, even with the most unfavorable cancers our rate pretty consistently stands at 7–10%. It's really a remarkable difference. And the rate of cancer recurring is only about 2–3%, vs. the United States national rate of 7–10%."

The Lankenau program is the Philadelphia region's first and the nation's 12th to earn accreditation from the National Accreditation Program for Rectal Cancer. ✨



WATCH THE VIDEO: To learn more about this story, scan the QR code.

Dr. Viatour brings expertise in cell regeneration, cancer to LIMR



Patrick Viatour, PharmD, PhD, joined LIMR's faculty in September as an associate professor, bringing a wealth of experience aimed at understanding rapid cell regeneration and cancer.

His laboratory focuses on a protein called transcription

factor E2f, which plays a role in the process of converting, or transcribing, DNA into RNA in the context of cancer and inflammatory reactions. RNA carries out biochemical reactions and can have complex functions in regulating cell

division. His long-term goal is to identify novel therapeutic strategies to harness proliferation and limit the accumulation of pathological cell populations, such as cells that are capable of forming tumors or causing inflammation.

Dr. Viatour recently received a prestigious five-year National Institutes of Health grant to support his research based on its strong preliminary data.

Dr. Viatour joins LIMR after spending the last nine years as assistant professor and principal investigator at the University of Pennsylvania and Children's Hospital of Philadelphia. He is originally from Belgium, receiving his PharmD, master's degree and PhD from the University of Liege. ✨

PA House Speaker Bryan Cutler (2nd from left) and State Rep. Morgan Cephas (3rd from right) toured LIMR on November 4. Here, they learn about the work of the Main Line Health Center for Population Health Research from its executive director, Sharon Larson. Also at the tour (from left), Lankenau Medical Center President Phillip Robinson and Vice President, Administration, Yonathan Kebede; Main Line Health President and CEO Jack Lynch and LIMR President and CEO George Prendergast.



UPDATES FROM LIMR RESEARCHERS

Scott Dessain, MD, PhD, and colleagues have created a groundbreaking rapid diagnostic test to successfully identify whether a patient with COVID-19 has a Delta or non-Delta variant. As the first rapid test to identify any of the COVID-19 variants, it provides the basis for detecting any future variants of concern. ✨

New research from Breastcancer.org by LIMR adjunct investigator **Marisa Weiss, MD**, indicates almost half of Americans with breast cancer use cannabis, most commonly during cancer treatment to manage symptoms including pain and anxiety. However, most patients rely on the internet and friends for information rather than consulting a physician. This story was covered by NBC News. ✨

An energetic approach to the challenge of melanoma



Marie Webster, PhD, seeks answers to treatment-resistant melanoma.

Marie Webster, PhD, brings an energetic approach to treating melanoma. In her work, she uses the entirety of a wide-ranging background, which includes receiving her undergraduate degree in chemistry and PhD in pharmacology before focusing on cancer as a postdoctoral fellow.

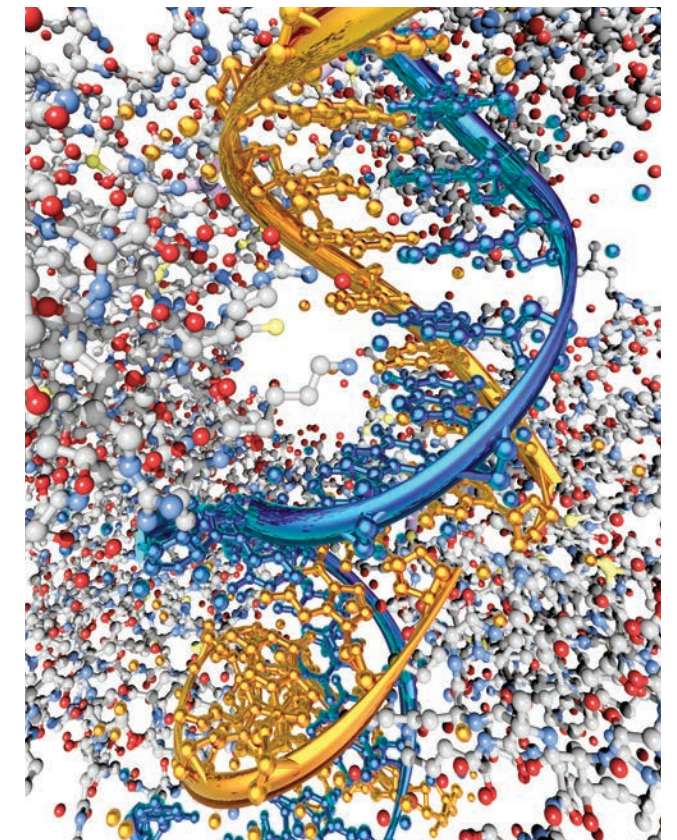
"My learning journey has led me to where I am now," she

says. "Chemistry involves making drugs, pharmacology is the implementation of treatment, and studying cancer is the application of that treatment. I wanted to understand the whole process of designing a drug and how you get it to its target."

Much of the journey occurred during graduate studies at Johns Hopkins University. She worked with a class of drugs called bisphosphonates, which prevent the loss of bone density and, because they bind to calcium, are used to treat such diseases as osteoporosis. However, the goal of her work was to mask the drugs' negative electrical charge so instead of binding to calcium they would penetrate tumor cells and create an anticancer delivery system. It turned out the cancer the drug best attacked was melanoma. For her postdoctoral work, Dr. Webster worked at the Wistar Institute, where they studied the link between melanoma metastasis—spreading of the cancer cells from their original site—and therapy resistance.

Dr. Webster's research now focuses primarily on understanding how cancer cells survive multiple types of stress—such as DNA damage, targeted therapy and aging—so better therapeutic strategies can be developed. That means focusing on metastasis.

"You have higher success if you catch the cancer early on," Dr. Webster says. "Therapy resistance occurs in later stages—that's the link between metastasis and therapy resistance. We look at how different stresses affect metastatic cells. The next step would be to find ways to target the key pathways as well as screen for it."



A model of molecules of protein p53 binding to a strand of DNA. The majority of human cancers involve mutations that make this protein inactive.

The microenvironment around the tumor—think of the skin of an older person vs. a younger one—can correlate to damaged DNA. She is studying how p53, a gene that typically acts as a gatekeeper for cell growth to prevent cancer, is promoting survival and disease progression in melanoma. Preliminary studies suggest that blocking p53 activity in metastatic melanoma promotes response to therapies currently used in the clinic.

But other stresses lead to melanoma too, particularly ultraviolet rays from the sun. That is why, Dr. Webster says, you should use sunscreen if you're in the sun. And have frequent skin checks. ✨

Supporting tomorrow's cures

RICHARD AND ANN FRANKEL TURNED THEIR INTEREST IN MEDICAL RESEARCH INTO A LEGACY SUPPORTING EARLY STAGE, PIONEERING INVESTIGATIONS AT LIMR

“We have a stellar, state-of-the-art medical center that excels in research and patient-focused care,” says Ann Frankel. “Richard and I want to ensure that Lankenau’s tradition of medical excellence continues for others.”

The Frankels have long been regular contributors to Lankenau Medical Center. Last year, though, they wanted to do more by establishing a meaningful legacy. Through conversations with leadership, Richard and Ann chose to establish an Innovative Research Fund at LIMR. The fund helps bridge financial gaps for researchers in the early stages of exploring novel ideas so they can spend more time on discovery and less on writing grant proposals. LIMR is working to sustain the blaze of innovative discovery. The Frankels understand philanthropy is critical to maintaining this momentum and perpetuating science when traditional funding sources are scarce.

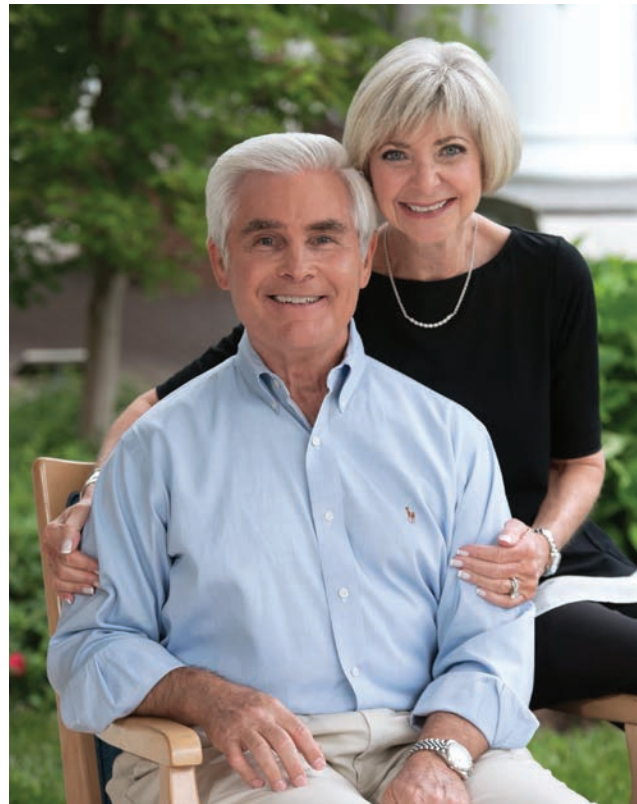
This interest was further spurred by Main Line Health’s extraordinary response to the COVID-19 crisis.

“I appreciate the responsible and reassuring way Main Line Health handled the COVID-19 outbreak and was especially impressed with how LIMR scientists quickly pivoted to battle the disease,” Richard says. He was intrigued by this nimble medical research center and its work in cardiology, cancer, regenerative medicine and autoimmune disease.

“I can’t overstate how grateful we are for the generosity of the Frankels,” says LIMR President and CEO George Prendergast. “We do important research in multiple areas. When trying to break ground in the early stages of demonstrating promise for a new direction, funding can be a challenge. Funds like the one established by the Frankels help enormously in making the leap of taking discoveries from the lab bench to bedside.”

In its first year, the fund will support investigation by LIMR Associate Professor Lisa Laury-Kleintop, PhD, into a little-studied enzyme that LIMR researchers identified recently as a “bad actor” in driving diabetes complications. Dr. Laury-Kleintop will conduct preclinical studies into the effects of blocking this enzyme, which she and LIMR colleague Dr. Melvin Reichman hypothesize could render diabetic subjects resistant to the damaging effects of high blood sugar.

The Frankels’ gift is the culmination of many years of experience as research enthusiasts, patients and philanthropists. Ann grew up immersed in the world of



medical research. Her father was a biochemist and vice president at Glaxo SmithKline in research and development; her mother worked as an assistant to Dr. Sidney Weinhouse at Temple University School of Medicine, where he continued his career after launching his groundbreaking cancer research at Lankenau.

“Ann and Richard Frankel have been tremendous supporters,” says Lankenau Medical Center President Phillip D. Robinson. “Richard serves on the board of the Lankenau Medical Center Foundation and was key in establishing our partnership with Abramson Senior Care. We are so grateful for this gift, which will help incubate and launch new studies and investigators.”

To create their legacy, the Frankels blended a current gift with a generous provision in their will to establish the Richard and Ann Frankel Endowed Fund for Innovative Research at LIMR. They are enthused about how the structure of their giving will impact LIMR. The current gift allows exciting work supported by the fund to begin immediately, while the donation from their estate will extend their impact to future generations of scientists and patients. ✨

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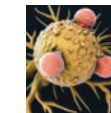
Your investments in research at LIMR can have a significant impact

You can designate one of the following funds to direct your contributions and support research that is important to you.



COVID-19 Research Fund

Your gift will support several biomedical scientists at LIMR who have pivoted their research toward battling the coronavirus. They are advancing studies to better diagnose, treat and prevent COVID-19 infection.



Immunotherapy Pioneer Fund

Immunotherapy entails the prevention or treatment of disease with substances that manage the immune system’s capabilities to clear disease, rather than attack the disease itself. LIMR has spearheaded unique studies of disease modifier pathways that impact immunity and cancer progression, developing new drugs to target them. Your generous contributions to this fund will help us to continue to advance these innovative directions.



Regenerative Medicine Vision Fund

Regenerative medicine deals with new processes of replacing, engineering or regenerating human tissues to restore or establish normal function. LIMR is privileged to have one of the pioneers in regenerative medicine, Professor Ellen Heber-Katz, PhD, who has discovered an experimental drug approach that may eliminate a need for stem cell transfer. Your contributions to the Regenerative Medicine Vision Fund will help further her research.



Biotechnology Innovation Fund

This fund supports work on biological molecules engineered by LIMR scientists that can enhance the diagnosis, prognosis and treatment of disease. Your generous contributions to this fund can help advance the work of our researchers including, for example, our studies on targeted nano-carrier therapeutics as experimental treatments for cancer, and our work on cloned human antibodies as treatments for infectious disease, cancer and neurological illnesses.



Cardiovascular Breakthrough Fund

Cardiovascular disease accounts for nearly 800,000 deaths in the United States every year, or about one of every three deaths. Additionally, about 92 million American adults are living with some form of heart disease or the aftereffects of stroke. LIMR is home to world-renowned cardiovascular researchers. Your gift to this fund will further research that could benefit the lives of millions of heart disease and stroke patients.

LIMR Unrestricted Fund

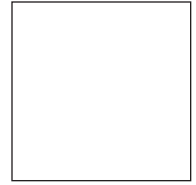
Unrestricted gifts to LIMR enable opportunities to target your gift where our doctors and scientists believe it can have the greatest impact.

To make a donation, please use the reply envelope inserted in this publication, or donate online at limr.org (click on Supporters). You may also call Amy Mansky of the Lankenau Medical Center Foundation at 484.476.8070, or email her at manskya@mlhs.org.



LANKENAU INSTITUTE FOR MEDICAL RESEARCH

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ABOUT MAIN LINE HEALTH

Main Line Health® is an integrated health system serving the Philadelphia region, with more than 2,000 physicians, one quaternary and three tertiary care hospitals, a wide network of patient care locations and community health centers, specialized facilities for rehabilitative medicine and drug and alcohol recovery, a home health service, and a biomedical research institute. Collectively, Main Line Health's physicians, care teams, health care facilities and researchers provide patients with primary through highly specialized care as well as access to clinical trials.