



Main Line Health®

LANKENAU INSTITUTE FOR MEDICAL RESEARCH

CATALYST

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INNOVATIONS PURSUED ON MULTIPLE FRONTS

LIMR's unconstrained environment for biomedical research enables Dr. Scott Dessain and his team to pursue several breakthroughs and advance them from the lab to the clinic. | [Page 3](#)

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LIMR's Organizational
Model is Transforming
Biomedical Research

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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.

ORGANIZATIONAL MODEL OF BIOMEDICAL RESEARCH

A MIX OF ACADEMIC AND ENTREPRENEURIAL CULTURES MEANS THAT KNOWLEDGE AND INVENTION ARE EQUALLY WEIGHTED FOR MAXIMUM RETURN ON INVESTMENT.

Aca-pre-neur-i-al

Nonprofit biomedical research in the United States is based almost solely on traditional academic models that focus on acquiring and validating new knowledge. But supporters of research are motivated mainly by the promise of useful inventions and applications of new knowledge that can improve human health and well-being. Toward such ends, academic models tend to perform relatively weakly because of that inherent disconnect in goals.

Unfortunately, most researchers or their supporters don't recognize this gap in alignment — and the opportunity that addressing it presents. Under the leadership of George Prendergast, PhD, the Lankenau Institute for Medical Research (LIMR) has created an organizational model that is a hybrid of academic and entrepreneurial cultures — he calls it “acapreneurialism” — that addresses this gap and strengthens the ability of LIMR's mission to improve human health.

“I came to Lankenau over a decade ago to conduct what I call the biggest experiment of my life,” says Dr. Prendergast, president and CEO of LIMR. “Having worked at academic research centers and pharmaceutical companies, I knew of the weaknesses of each and wanted to test a new way to organize biomedical research to better leverage its transformative potential.”

With the support of the LIMR Board and Main Line Health, Dr. Prendergast began to change the culture and tenets at LIMR to create an organization that has become extremely productive, relative to its peers, with little change

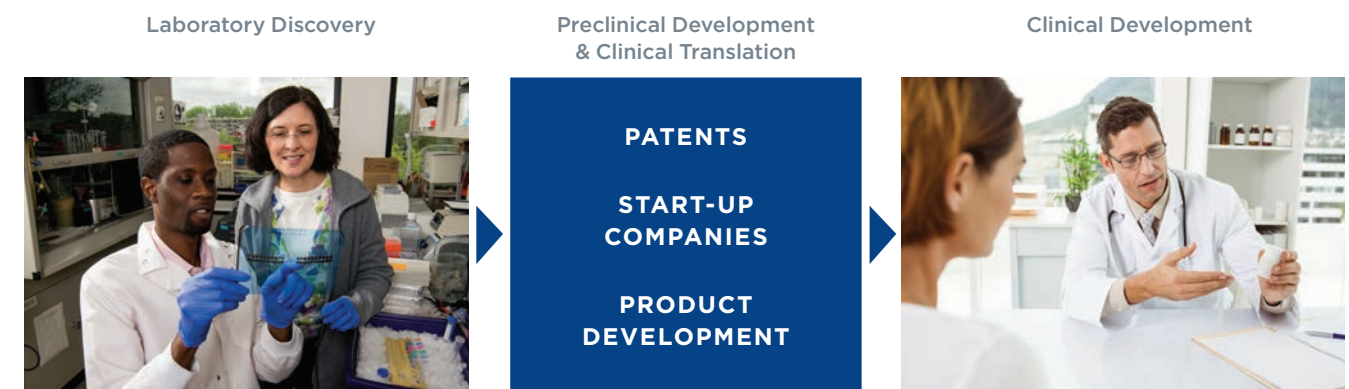
in the overall financial support from the hospital foundation and health system during the same period. “After about a decade of experience with our acapreneurial model for nonprofit biomedical research, it's time to share our expertise and experience, including helping our supporters understand how our efforts are improving their return on investment,” says Dr. Prendergast.

Attributes of the acapreneurial model

The acapreneurial model of biomedical research encompasses a hybrid culture that integrates, in a single facility, academic, entrepreneurial, clinical and population health elements — aspects that typically are separated in academic and for-profit centers. A central element is the integration of a biotechnology start-up company incubator located literally side-by-side with the nonprofit laboratory and clinical researchers seeking to move their discoveries to the clinic. Why is that important? Companies are product-oriented and thus extremely focused on practical issues that aren't generally the goal of nonprofit researchers. So the mixture of the two — a start-up company and a nonprofit lab — is powerful.

When it works, “bench to bedside” research usually means “bench to bedside moves through biotech.” That is, laboratory discoveries move off the lab bench and then through the biotechnology and pharmaceutical industries before they can benefit patients in the clinic. That route

Bench to Bedside Goes Through Biotech



LIMR's ‘acapreneurial’ culture combines elements of academia and entrepreneurialism to tighten the focus of our research on invention and product development. The mechanisms LIMR uses enable the significant investment needed to move any new experimental test or therapy uncovered in the laboratory to clinical trials that can improve cutting-edge treatment options for patients.

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through biotech, which entails years of clinical testing and FDA approval, is extremely costly and fraught with complex regulatory issues dictated by modern ethics and federal law. Only through corporate investment can those costs be handled.

Moreover, the acapreneurial culture bends toward invention, not simply new knowledge. Most new knowledge is simply not practical. LIMR's hybrid culture enables a better read on what's practical and what's not. In essence, as Dr. Prendergast notes, LIMR has created a non-profit test case in which knowledge and invention are equally weighted.

LIMR's four tenets of practice in the acapreneurial culture

First, unlike their academic peers, LIMR researchers must invent and then patent and license their inventions to a company for development — what Dr. Prendergast calls the “three Ps of innovation”: preclinical proof-of-concept, patent, and peer-reviewed publication. In short, the grant-and-publish cycle of traditional academia has been re-oriented at LIMR to invention proof-of-concept as the goal.

Here's why: Patents are vital to move a new idea to clinical testing. “Without them, ideas stall because of the lack of an investment mechanism to handle the high cost of the FDA regulatory equation,” explains Dr. Prendergast. To date, LIMR has created a patent portfolio of about 100 issued and pending U.S. and international patents, many of which have been licensed or partnered with for-profit biopharmaceutical companies. LIMR also has incubated 16 start-up companies, eight of which have successfully moved a new medical technology into clinical testing and/or been purchased by a larger company that has done so.

For example, Immunome, a biotech company developing cancer immunotherapies, is a LIMR faculty-founded firm that developed sufficiently to raise about \$15 million in investment from a New York venture group, allowing the company to “graduate” from LIMR and expand its operations at a new site.

Another example: LIMR has a patent portfolio of technologies licensed to a faculty-founded company called OncoRx that was subsequently acquired by a large biopharmaceutical company, NewLink Genetics. The latter incubated some work at LIMR and later went public with an initial public offering, raising sufficient capital to move the first of LIMR's immuno-oncology therapies, called IDO inhibitors, into clinical trials.

The second tenet, a hybrid management style, is used to chart a middle pathway between the independence of the tenured academic investigator and the top-down direction of the corporate researcher. LIMR's weekly “orbit” meetings integrate management perspectives based on mutual trust relationships of program leaders and faculty peers. While it took time to develop, this concept has paid off: Over the past decade, LIMR has published more peer-reviewed papers (with the same journal impact) than it ever has in its history, while at the same time re-focusing its culture.



“After about a decade of experience with our acapreneurial model for nonprofit biomedical research, it's time to share our expertise and experience, including helping our supporters understand how our efforts are improving their return on investment.”

— George Prendergast, PhD
LIMR President and CEO

The third tenet, co-invention with companies, is strongly supported. Faculty are encouraged to participate as advisors or science officers in start-up companies, within the guidelines of patent and start-up policies approved by the LIMR and Main Line Health Boards. New mechanisms of financial support are enabled by such relationships to help speed lab-based discoveries to clinical testing. An example of this type of work is LIMR Deputy Directory Dr. Janet Sawicki's cancer nanotherapy drug that was co-invented with the Hatfield, Pa.-based company Genisphere and is in preclinical development for a clinical trial.

Lastly, as part of the acapreneurial model, LIMR invests materially in for-profit translation of its products by trading institutional space and services for equity positions in companies advancing its mission. For the most attractive inventions made by Lankenau physicians and scientists, LIMR has also made capital investments from its endowment holdings. “This tenet seeks financial return on the success of its inventors to enable future financial sustainability for making new discoveries,” explains Dr. Prendergast.

The next phase

Now in his second decade at LIMR, Dr. Prendergast is planning a pivot for the acapreneurial model. He calls it acapreneurialism 2.0. “The next phase of our evolution will incorporate the core goal of medical products devised during version 1.0, but orient LIMR more broadly toward population health and patient care solutions, in which medical products as a goal are integrated.”

This pivot recognizes the coming revolution in health care, where the patients' interests, involvement and satisfaction come ever more strongly to the forefront of patient care.

Indeed, as Dr. Prendergast sums up: “Harnessing the hope that springs from research is requiring closer engagement of supporters and beneficiaries in its organization and conduct — that is, if the fundamental science and discovery cycles that propel human progress are to continue to march forward effectively and sustainably.” ★



“In the lab, we keep a lot of proverbial ‘pots on the stove’ at once. When something bubbles over, we stir it and see what we get,” says LIMR Professor Scott Dessain, MD, PhD, pictured in his lab with post-doctoral fellow Rashmi Sharma, PhD (left), and Research Assistant Professor Fetweh Al-Saleem, PhD.

LIMR'S ACAPRENEURIAL ENVIRONMENT FOR BIOMEDICAL RESEARCH ENABLES DR. SCOTT DESSAIN AND HIS TEAM TO PURSUE SEVERAL BREAKTHROUGHS AND ADVANCE THEM FROM THE LAB TO THE CLINIC.

Innovations Pursued on Multiple Fronts

While most biomedical researchers select a disease or therapy to study and then pursue that interest with a singular focus, others prefer the boundless approach. They focus on the problems they find in the lab or clinic and search for solutions, no matter where or in which intellectual direction it leads. For them, science is a wide-ranging, creative pursuit.

One such researcher is LIMR's Scott Dessain, MD, PhD, The Joseph and Ray Gordon Chair in Clinical Oncology and Research, whose scientific interests include both oncology and immunology. In his clinical practice at Lankenau Medical Center, he treats patients with lung and blood cancers, and he teaches clinical oncology to Lankenau medical fellows. He also has ventured into the entrepreneurial world by starting a successful biotechnology company, a process that led him to co-author a book advocating for sweeping changes to the commercialization of biotech discoveries.

“Scott is a triple threat: one of the rare breed of individuals who are directly involved in clinical care, academic education and research, and entrepreneurial product development,” says LIMR's President and CEO George Prendergast, PhD.

Explains Dr. Dessain: “I find it's best to try and solve the problem that's in front of you. So we're always trying to determine what path forward will be the most impactful.”

Stirring many pots

In his LIMR laboratory, Dr. Dessain and his team pursue several research avenues to treat human disease, including cancer, neurological disorders, polio, and illnesses triggered

by bacterial toxins. Notably, all of his work builds on a powerful technology he developed to clone human antibodies. The technology's chief feature is its ability to clone antibodies of patients who've had a particular clinical course, for example, a cancer patient who successfully fought off an aggressive and otherwise deadly disease.

“My lab team has broad expertise and diverse skills,” he says. “They're continually reading and asking questions. We keep a lot of proverbial ‘pots on the stove’ at once. When something bubbles over, we stir it and see what we get. When it's ready, we seek funding to pursue it further or submit a manuscript announcing our results.”

His adhere-to-no-limits approach to research was learned early. After graduating from Yale University in 1994 with a medical degree and a doctorate in biology, Dr. Dessain worked as a lab technician for Robert Weinberg at MIT's Whitehead Institute for Biomedical Research, one of the world's leaders in cancer genetics and cell biology. “For Dr. Weinberg and the brilliant young scientists in his laboratory, science was a kind of playtime,” recalls Dr. Dessain. “They knew no boundaries. They went wherever their curiosity took them. I knew I'd always want to live in that world.”

That enthusiasm is a big part of what drew him to LIMR. The unique, unconfined approach to biomedical research that exists at LIMR has enabled Dr. Dessain to work through diverse routes to advance the frontiers of research. Unlike other institutes, LIMR dissolves traditional walls that separate scientific disciplines, lab and clinical researchers, and start-up companies — the latter of which are needed to turn scientific discoveries into impactful advances.

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Method to clone human antibodies

Dr. Dessain's lifelong interest in cancer research was sparked by his grandmother's battle with the disease. "I've always been angry at cancer — and fascinated by it," he says. But his research on the human immune response is broader than his work on cancer and has taken him down unexpected roads.

In appreciating his groundbreaking technique for cloning "native" human monoclonal antibodies, it's helpful to provide a quick primer on immunobiology. The immune system provides constant surveillance to protect against infectious diseases, toxin exposures and cancers. Part of the immune response is in the form of antibodies produced by B cells. Antibodies can neutralize infectious entities and may even help combat tumor cells.

While other technologies exist to clone human antibodies, Dr. Dessain's achievement is on "native" human antibodies, that is, antibody molecules that exactly match the structure synthesized by a normal human immune system. His antibodies have several advantages, including the highest specificity, safety and effectiveness as created naturally in the body.

Before Dr. Dessain developed his methods, the only way to make a therapeutic antibody was to engineer it in an animal and then "humanize" it. Researchers knew native human antibodies could provide many clinical benefits, but methods to generate them in the lab directly from a human had been elusive.

While at MIT, Dr. Dessain was asked by Dr. Weinberg to try to create a model of the blood cancer lymphoma by using human B cells as a starting point. Dr. Dessain first tried to get the B cells to grow in the lab. Then another professor asked if a similar approach might be used to generate human antibodies.

"I realized how we could solve an age-old problem in human antibody cloning: Why does the cell culture method work for mouse cells but not human cells? Human cells lost their chromosomes. The answer was to prevent that from happening," recalls Dr. Dessain. "That realization came on a Friday. By the following Monday, I was all-in for antibodies. But it wasn't until over a year later that I finally got it to work, and another seven years until I got it working really well."

Ultimately, Dr. Dessain and his colleagues developed an innovative and powerful human antibody cloning technique that required only a small amount of blood from an individual.

At LIMR, Dr. Dessain's Center for Human Antibody Technology (CHAT) combines his platform invention with a state-of-the-art, high throughput antibody production and screening facility to produce native human antibodies that can be evaluated for disease treatment. As its director, Dr. Dessain makes CHAT available not only to the LIMR faculty but also to regional academic investigators to help them create their own human antibody therapies.

Also in keeping with LIMR's acapreneurial culture, Dr. Dessain founded a successful biotechnology company, Immunome, Inc., focused on the development of cancer immunotherapies. He retains a role as scientific consultant based on his inventorship on three issued U.S. patents.

"Entrepreneurial activities such as Dr. Dessain's are vital to raise the significant capital required to move a lab invention to clinical testing," notes Dr. Prendergast. "His story is a paradigm of LIMR culture in showing how bench to bedside goes through biotech."

Says Dr. Dessain, "I didn't become a doctor to be an entrepreneur, but I realized it's not enough to sit in a lab hoping someone will take your invention to market. You have to get out there and try and make it happen yourself. Plus, if you're only sitting in your lab, you'll never discover what the world really needs or if what you think is so interesting in the lab actually has a path to the clinic."

Neutralizing dangerous diseases

In an early proof of concept, Dr. Dessain's team has cloned antibodies that can attack bacterial toxins and several disease molecules. Native human monoclonal antibodies were created to block the action of botulism neurotoxin, which the National Institutes of Health (NIH) has designated a bioterrorism agent of highest risk. In acting as a neutralizing serum, these antibodies have the qualities needed to protect patients exposed to deadly levels of this agent.

They've also cloned antibodies that can bind and interfere with plaque proteins thought to drive Alzheimer's disease. And in a parallel project, they cloned antibodies from a Lankenau patient that may help other patients with a neurological syndrome that causes psychosis, seizures and loss of consciousness — a condition lacking effective treatment.

In another illustration of how the technology can be used, Dr. Dessain's team generated a panel of antibodies against polio virus with unique properties that can neutralize the common viral strains that persist today. "The Global Polio Eradication Initiative, which is funded by the World Health Organization [WHO], UNICEF and others, sees neutralizing antibodies as part of an overall worldwide plan," says Dr. Dessain. "We think we can help with that."

While his is not the traditional, narrowly focused research career, Dr. Dessain remains committed to providing durable improvements in patient health. "Maybe someday my work will lead to a drug that will make someone's life and health better. That would make me very satisfied."

Reflecting this aspiration, Dr. Dessain's research over the years has been funded by NIH, WHO and prestigious private organizations such as the Bill and Melinda Gates Foundation. ★

To help other researchers, Dr. Dessain co-wrote the book "Preserving the Promise: Improving the Culture of Biotech Investment" (Academic Press/Elsevier; 2016), a thoughtful and critical analysis of the process of translating lab findings into medicines. He and his co-author deconstructed the early-stage, pre-venture capital phase of commercialization of a biomedical product such as a new drug, and explored the difficult obstacles scientists and entrepreneurs face. They then proposed practical solutions that can help speed the process.



Mission: Determine Which Chemotherapy Patients Will Develop Nausea

One of patients' most feared side effects of chemotherapy is nausea that can be debilitating and last for days. Yet not everyone experiences such effects equally — or even at all. Knowing what level of anti-nausea therapy should be part of a patient's medication regimen has been a challenge for health care professionals. Until now.

A blood test developed by researchers at LIMR and Lankenau Medical Center was found to reliably predict the patients who were likely to experience nausea after chemotherapy.

"ChemoTox is our blood-based assay that can help alert physicians to those oncology patients for whom we must prescribe more potent anti-nausea drugs," said Paul B. Gilman, MD, director of clinical research at LIMR and one of the study's researchers. "If used in wide clinical practice, patients could be tested prior to starting chemotherapy, thus enabling caregivers to devise an optimal and personalized nausea-prevention regimen."

While a small initial study of just 64 patients undergoing chemotherapy at Lankenau, ChemoTox classified — with almost 90 percent accuracy — patients' nausea sensitivity. Lead scientist on the study, U. Margaretha Wallon, PhD, LIMR assistant professor, noted: "To our knowledge, this is the first report demonstrating an unbiased biochemical method to predict delayed nausea in patients receiving chemotherapy."

A recently conducted second round, this time of 97 patients, confirmed the accuracy of the test. "And while that's good news, many more patients — probably several hundred — will be needed to supply the additional statistical analysis needed by federal regulatory authorities before they can approve the testing method," Dr. Wallon also noted.

Word of their research is spreading

Drs. Gilman and Wallon continue to recruit Main Line Health patients into the study, and the world is taking notice of their research — from manuscripts published and invitations for speaking engagements to additional research locations. For example, their results were published in the journal *Support Care Cancer*. Dr. Wallon was invited to give a talk on ChemoTox at the 25th World Congress in Nursing Care, held last summer in Australia. And officials at Thomas Jefferson University's Sidney Kimmel Cancer Center and its affiliated physician network are planning approval of the ongoing trial for their cancer patients.

"By knowing which patients are susceptible and treating them effectively, we can save them from feeling sick after chemotherapy while at home and then showing up at the emergency room or their doctor's office malnourished, dehydrated and feeling terrible," said Dr. Wallon.



"ChemoTox can enable precision medicine: to give the right anti-nausea drugs to the right patient at the right time," said U. Margaretha Wallon, PhD, LIMR assistant professor, pictured here with Paul B. Gilman, MD, director of clinical research at LIMR.

Likewise, patients at a lower risk of delayed nausea may be able to reduce anti-nausea therapies, sparing them the ill effects of these medications and reducing health care costs.

"ChemoTox can enable precision medicine: to give the right anti-nausea drugs to the right patient at the right time," said Dr. Wallon. "That could make cancer treatment so much easier for patients. They could feel well enough to go about their lives and not be fearful of, or debilitated by, delayed-onset nausea."

To date, the researchers have included in the study patients with lung and colorectal cancers. Looking ahead, they hope to include patients with breast and ovarian cancers.

Their research thus far has been funded by grants from Pennsylvania's Tobacco Settlement Fund and the W.W. Smith Charitable Trust. Additional funding is needed to expand the number of patients studied and to buy equipment — for example, a spectrophotometer with printer that would cost about \$7,000 — to better determine results. ★

Updates From LIMR Researchers



Pennsylvania Senator Bob Casey (right) and other state and local officials visited LIMR in 2017. They toured the lab of LIMR Professor **Ellen Heber-Katz, PhD, (left)** to learn about her groundbreaking research on regenerative medicine and its potential to help patients recover from injury. Several dignitaries that day also toured the lab of **Charles Antzelevitch, PhD,** to hear about his team's work on bioengineered hearts.

The Main Line Health Center for Population Health Research (CPHR) at LIMR produced a scientific review of safe injection sites as a means to help combat the opioid epidemic. The study, entitled "Supervised Consumption Facilities — Review of the Evidence," was produced by CPHR at the request of the Office of the Health Commissioner, Philadelphia Department of Public Health. Supervised consumption facilities (also known as safe drug injection sites) are medical interventions in which essential services are provided to reduce substance use, the harms associated with substance abuse, and fatal overdoses.

The Lankenau-Israel Strategic Alliance (LISA) is a new program whose mission is to develop collaborations between physicians and scientists at Lankenau Medical Center and medical centers in Israel. Under the umbrella of the Israel Heart Society, the program fosters mutually beneficial cardiology research with an emphasis on heart rhythm disorders and the development of novel therapeutic approaches. The first LISA Fellow selected to participate, **Itai Weissberg, MD, PhD,** joined the Cardiovascular Research Program at LIMR in 2017. The program is being funded by Mark Cohen, a member of Lankenau's President's Advisory Council and other local donors.

Janet Sawicki, PhD, LIMR professor and deputy director, and her team demonstrated that elevated levels of the HuR gene product led to pancreatitis and that when combined with a cancer-promoting genetic mutation empowered the development of pancreatic cancer. Their results could point the way to a new therapeutic target to treat pancreatitis, a known risk factor for pancreatic cancer.

Susan Gilmour, PhD, LIMR professor, and colleagues reported that expression of a mutant BRAF protein (found in half of all melanoma tumors) significantly increases the uptake of polyamines into the tumor cells. Capitalizing on that information, they then synthesized a novel compound that selectively killed melanoma tumor cells in preclinical studies.

Melvin Reichman, PhD, director of LIMR Chemical Genomics Center, received a National Institutes of Health grant for research that aims to discover new drug candidates for treating synucleinopathies, which are neurodegenerative disorders that include Parkinson's disease and certain Alzheimer's disease-related dementias.

Renowned Lung Cancer Researcher and Specialist Joins LIMR, Main Line Health



LIMR and Main Line Health welcomed Tracey Evans, MD, a researcher and clinician who specializes in thoracic medical oncology. In addition to her clinical practice at the Cancer Center at Lankenau Medical Center, Dr. Evans is engaged in research and graduate medical education. She is serving as Lankenau's director of thoracic oncology research and

associate program director for the Hematology/Oncology Fellowship Program.

Board-certified in internal medicine, oncology, and hospice and palliative medicine, Dr. Evans was a member of the faculty of the University of Pennsylvania since 2002 and is one of the region's most highly regarded lung cancer specialists.

"Over the years, Dr. Evans' research has helped advance our knowledge of safe and effective treatment options for patients diagnosed with lung cancer," said George Prendergast, PhD, president and CEO of LIMR. "We're thrilled to add her research expertise in lung cancer, which is relatively more frequent in our region than nationwide and where many exciting new therapies are emerging. We're certain she will have a significant impact on our cancer research initiatives."

Dr. Evans earned her medical degree from the University of Pennsylvania and completed her internal medicine residency at Brigham & Women's Hospital, Boston. She also completed a fellowship in hematology-oncology at Dana-Farber/Partners CancerCare. She was named a Top Doc from 2012 to 2016 by *Philadelphia Magazine*, and her research has been published in leading biomedical journals, including *Journal of Clinical Oncology*, *Clinical Cancer Research* and *American Journal of Clinical Oncology*.

"I wanted to join Main Line Health and LIMR because they provide state-of-the art, patient-centered health care and a robust clinical research infrastructure," said Dr. Evans. "In addition to treating patients with lung cancer, I will continue my efforts to research new treatments for all stages of this disease. So much has changed in the 15 years that I've been working with lung cancer patients — new oral, targeted therapies have been introduced, and more recently, immunotherapy. Both approaches have led to better outcomes with longer treatment responses but fewer side effects than traditional chemotherapy.

"That said, these approaches don't work for everyone with lung cancer, and even when they do, the cancer ultimately resists current treatments," continued Dr. Evans. "So there's still a lot of research needed." ✨

Building Integrated Partnerships to Improve Patient Health



Professor Sharon Larson, PhD, executive director of the Main Line Health Center for Population Health Research at LIMR

Population health is a relatively new term in the health care world, and it's been defined in the broadest sense as addressing large-scale social, economic and environmental

issues that impact health outcomes of groups of people. Population health seeks to improve decision-making so as to reduce inequities or disparities in health care delivery. And it emphasizes the *value* of care — that is, the quality and outcomes for patients — rather than the *volume* of services provided.

In 2016, the Main Line Health Center for Population Health Research (CPHR) at LIMR was founded as a collaboration between Main Line Health and Thomas Jefferson University's (TJU) College of Population Health. Sharon Larson, PhD, was named executive director of CPHR last year and has a faculty appointment in TJU's College of Population Health. Dr. Larson is an expert in social and behavioral health research, program evaluation, and community-based research. Before joining CPHR, she held positions of increasing responsibility at Danville, Pa.-based Geisinger Health System, including chair of the Department of Epidemiology and Health Services Research. Prior to that she served as the associate director of science and division director for Evaluation, Analysis and Quality at the Substance Abuse and Mental Health Services Administration of the U.S. Department of Health and Human Services.

Dr. Larson, Associate CPHR Director Norma Padrón, PhD, and their staff work closely with Main Line Health clinicians and researchers to identify and explore the underlying social, economic and physical determinants of population health in our community.

Q: Population health as a research focus is becoming more important for health care delivery systems such as Main Line Health. What's driving that trend?

Dr. Larson: A number of events are driving this. Some are related to regulatory and legislative mandates — including those found in the Affordable Care Act and from the Centers for Medicare and Medicaid Services under MACRA [Medicare Access and CHIP Reauthorization Act] — that require organizations to pay particular attention to care delivery in vulnerable populations. We know that access to care and community resources vary across populations.

We also know that prevention and early treatment for almost every condition reduces the cost of care in the long term. Thus, health systems are focusing on what we call "value-based care," defined as improving quality and

outcomes for patients. It reduces mortality and morbidity, and improves patients' quality of life. And it's good for the health system by enabling us to use our resources more effectively to serve more people.

Q: You have such deep knowledge of the distribution and incidence — the epidemiology — of social and behavioral health. What promoted that interest?

Dr. Larson: Behavioral health, also referred to as mental health, and health behavior, that is, an action a person takes to maintain or attain good health and prevent illness, are important components of overall health. These areas were neglected for a long time and, in the case of mental health and substance abuse, have been highly stigmatized.

I've long been interested in the differences in the way we as a society look at, say, heart disease, stroke and cancer compared to depression. All have some basis in social and behavioral science, as well as in physiological and other sciences. And yet providers and patients alike view heart disease as a "physical" problem and depression as a "mental" problem rather than looking at them together as "health" problems — leading, unfortunately, to underdiagnosis and inadequate treatment for conditions like depression.

Interestingly, many patients with chronic physical conditions, like diabetes, arthritis and heart disease, are more likely to also suffer from depression than the healthy population. Vulnerable populations, such as the economically disadvantaged, are at higher risk for these conditions and are more likely to be diagnosed only after they've reached more advanced stages of disease, thus leading to poorer outcomes and more disability.

Q: What do you hope to accomplish in your role at LIMR and Main Line Health?

Dr. Larson: I hope to partner with Main Line Health patients and clinicians to identify opportunities for better understanding of the role of population health in promoting improved access and high-quality care. Population health research should be a partner in the background, promoting sound strategies for asking and answering questions about how to continue to deliver excellent care.

I also hope to develop patient partnerships. Patients should be involved in deciding the important questions in health research, how best to answer those questions, and what actions should occur as a result of the findings.

Third, I hope to partner with my research colleagues to develop a research center that becomes the model for other health systems. Health care systems must be able to define who their vulnerable populations are and develop strategies for addressing the vulnerabilities. A research center can help the system think strategically and creatively.

Lastly, I want to develop a data system that allows Main Line Health to quickly characterize where there's need and rigorously assess program implementation and changes. ✨

The Gordon Family: On a Mission to Improve Lives

One of the true guiding lights of the modern era of Lankenau Medical Center was the husband-and-wife duo of Joseph and Ray Gordon. Though they have both passed — Joe in 2015 and Ray in 2011 — they left an indelible mark on Lankenau and Main Line Health. Both Joe and Ray provided innovative and astute leadership, combined with a generous philanthropic spirit toward Lankenau and LIMR over the course of nearly 40 years of prolific volunteer service to both institutions.

Joe Gordon, a longtime emeritus member of the Lankenau Medical Center Foundation Board of Trustees, including an incumbency as its chairman, also served as chairman of the Main Line Health Board of Trustees from 1988 to 1998, and he was a long-time member of the LIMR Board of Trustees. Joe recognized the strategic benefits of Lankenau Hospital and Bryn Mawr Hospital joining forces and played a critical role in the complex negotiations that resulted in the formation of Main Line Health in 1985, with the addition of Paoli Hospital one year later.

Innovations, like the creation of Main Line Health, were nothing new to Joe Gordon, a prominent and respected attorney and banking executive at Philadelphia National Bank (PNB) and its successor, CoreStates Bank. While working as chief counsel at PNB, Joe had his most notable professional achievement: creating the legal framework of the Money Access Center, better known in this region as the MAC automated teller network, now used by millions of people around the world.

The Gordons, through their personal giving and their philanthropic arm, now called The Gordon Charter Foundation, made numerous gifts to Lankenau over the years. In 2011, after Ray's passing, Joe's thoughts turned to helping Lankenau in his wife's memory. The Gordon family turned their grief into action by creating two key philanthropic gifts, bolstering Lankenau's bedrock clinical programs in both heart care and cancer care.

Lankenau now benefits from the creation of two endowments: the Joseph and Ray Gordon Chief Fellow in Interventional Cardiology, a gift supporting the education of the next generation of physicians at Lankenau; and the Joseph and Ray Gordon Chair in Clinical Oncology and Research, a unique hybrid clinical and research role. The latter aims to translate cancer research from theory to practice, or from "bench to bedside." This was an idea supported by Joe before his passing and championed now by his daughter Leila, a Lankenau Medical Center Foundation Trustee in her own right

and the leader, with her siblings Hunter and Scott, of The Gordon Charter Foundation.

Lankenau's Medical Distinctions Committee nominated LIMR Professor Scott Dessain, MD, PhD, for consideration for the inaugural Joseph and Ray Gordon Chair in Clinical Oncology and Research, and last year he was unanimously approved by the Lankenau Medical Center Foundation Board of Trustees. Dr. Dessain is acclaimed for his research in oncology and immunology and for his clinical work seeing patients at Lankenau Medical Associates. (For more on Dr. Dessain's groundbreaking research, please see page 3.) His unusual combination of clinical *and* research acumen is a critical component of meeting the aims of the new Joseph and Ray Gordon Chair.

Upon being named, Dr. Dessain noted, "In accepting this honor, I am inspired to promote the legacy of Joe Gordon's inquisitive mind and intellectual spirit in our quest to find new immunologically based therapies for the treatment of a variety of diseases."

The two endowments stay true to the mission of The Gordon Charter Foundation, which is to improve lives through health care, medical research and educational organizations primarily in the Greater Philadelphia area — a mission that Joe and Ray were deeply committed to in partnership with Lankenau and LIMR and one that is carried on by their children through The Gordon Charter Foundation. ✨



The Gordon Family (from left): Scott, Ray, Joseph, Leila and Hunter

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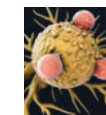
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In Medicine, Hope Springs from Research

Your investments in research at the Lankenau Institute for Medical Research (LIMR) can have a significant impact on health care. You can designate one of our special funds to help precisely target your contributions to research that matters to you.



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 attacking 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.



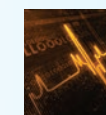
Regenerative Medicine Vision Fund

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, enabling her and her team to continue groundbreaking work on this approach that holds enormous promise for the future of health care.



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 after-effects 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 are important in enabling opportunities to target your gift where our doctors and scientists believe it could have the greatest impact.

Save the Date!

THURSDAY, MAY 17 | 12:00 PM

WHAT IS Immunotherapy?

How it's revolutionizing
cancer treatment,
and the role of
genetics in cancer risk



GEORGE C. PRENDERGAST, PHD
President and CEO

LANKENAU INSTITUTE FOR MEDICAL RESEARCH

WHAT IS IMMUNOTHERAPY? Join us for a Facebook Live video chat to find out.

LIMR President and CEO George Prendergast, PhD, a pioneer in immunotherapy, will explore how immunotherapy is revolutionizing cancer treatment, the latest research discoveries and how genetics plays a key role in cancer risk.

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