



2022 PMC PROGRESS UPDATE

The
Dana-Farber
Campaign

Defy Cancer



THE 2022 PAN-MASS CHALLENGE

The Pan-Mass Challenge (PMC) presented by the Red Sox Foundation and M&T Bank, the nation's single most successful athletic fundraiser, was back and better than ever in 2022. Participants rejoiced at being "back in the saddle again," as many pandemic restrictions were lifted and PMC weekend returned to the traditional format beloved by alumni and newcomers alike. The PMC had its best year yet, raising a record \$69 million for Dana-Farber in 2022 and elevating the PMC's cumulative fundraising total to an extraordinary \$900 million since 1980.

This historic performance was powered by the 43rd PMC on August 6-7, during which riders from 43 states and 8 countries pedaled 16 routes—from 25 to 211 miles—across Massachusetts in one of the hottest rides on record, with temperatures reaching into the 90s. They were supported by more than 3,000 dedicated volunteers and countless cheering fans along the way. Many Dana-Farber faculty and staff rode or volunteered, as did 950 cancer survivors and patients, who are themselves Living Proof of the PMC mission.

Throughout the year, thousands more also joined in through PMC Winter Cycle, PMC Kids Rides, and the inaugural PMC Unpaved. These collective efforts make an impact on patients because every rider-raised dollar goes directly to Dana-Farber's world-class cancer research and care. As the Institute's largest single donor, accounting for more than 60% of the Jimmy Fund's annual revenue, the PMC fuels everything the Institute does to defy cancer.

The present report provides a snapshot of how funding from the PMC was used in 2022 to propel progress across and beyond Dana-Farber's labs and clinics. These pivotal advances underscore and amplify the PMC's incredible impact, which grows each year and benefits patients everywhere.



"The PMC is here for us year after year, touching every aspect of our mission. Because of the PMC, Dana-Farber is forging scientific breakthroughs, translating these advances into better therapies, and delivering on our promise of extraordinary patient care for all. And for that, the PMC will always have our deepest gratitude."

Laurie H. Glimcher, MD

President and CEO of
Dana-Farber Cancer Institute

2022 PMC BY THE NUMBERS

\$69 MILLION

Raised

6,500+

Riders

3,000+

Volunteers

950+

Living Proof riders and volunteers

140

Dana-Farber faculty and staff participants

43

States

8

Countries



DANA-FARBER CANCER INSTITUTE

Dana-Farber Cancer Institute has been improving the lives of patients since 1947, starting with our founder, Dr. Sidney Farber, who achieved the first remissions in childhood leukemia and ultimately pioneered modern chemotherapy.

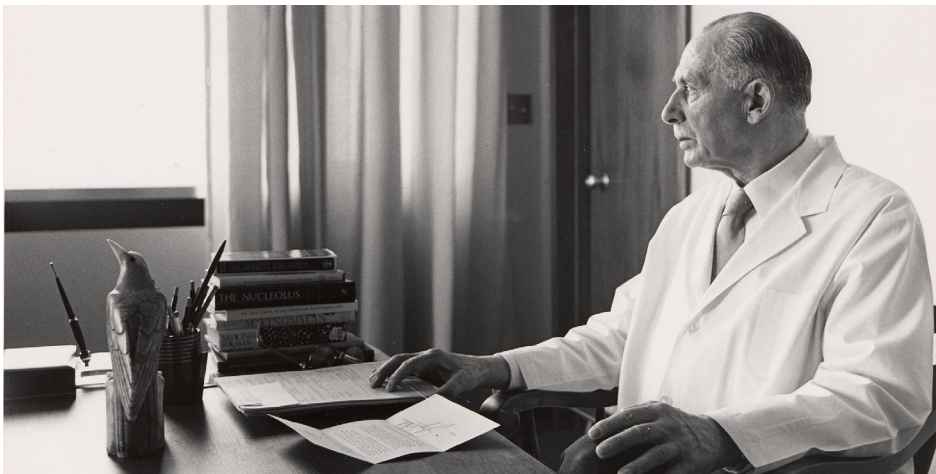
Seventy-five years later, bolstered by the PMC's powerful partnership, the Institute continues to lead the field in developing and disseminating innovative patient therapies and scientific discoveries across the globe and setting the standard for total patient care. A principal teaching affiliate of Harvard Medical School and founding member of Dana-Farber/Harvard Cancer Center—a federally designated Comprehensive Cancer Center—Dana-Farber has been the top-ranked cancer hospital in New England by *U.S. News & World Report* for 22 consecutive years and is the only cancer center in the country ranked in the top 4 for both adult and pediatric cancer programs. The Institute was named as the #4 ranked hospital in the world by *Newsweek* on its 2022 list of the World's Best Specialized Hospitals, and is the only hospital in New England to be ranked in the top 13 for oncology.

Such success is a direct reflection of the PMC's robust support and of Dana-Farber's commitment to maximizing the impact of this unparalleled funding. Because of the PMC's sustained investment for more than half of the Institute's history, Dana-Farber is well-positioned and equipped to build on this excellence and propel even greater progress against cancer.

"I have never accepted the incurability of cancer. And, I have remained hopeful, not because of wishful thinking—that's not progress—but because of the factual evidence of progress."

Sidney Farber, MD

Founder of the Children's Cancer Research Foundation, which later became Dana-Farber Cancer Institute



DANA-FARBER BY THE NUMBERS

552,819

Infusion treatments and outpatient visits

86,066

Total patients

29,070

New patents in 2022

1,100+

Open clinical trials

1ST

Ranked women-led business in Massachusetts by *Boston Globe Magazine*

1ST

Ranked cancer center in New England on *U.S. News & World Report's* Best Hospitals Guide for the 22nd year in a row

4TH

Ranked cancer center on the 2022 *Newsweek* "World's Best Specialized Hospitals" list

DANA-FARBER'S 75TH ANNIVERSARY:

A HISTORY OF HIGHLIGHTS POWERED BY THE PMC

In 2022, the Institute celebrated its diamond anniversary, providing an opportunity to reflect upon the many meaningful milestones over the years—including those listed here. Because the comprehensive funding provided by the PMC bolsters everything that happens at Dana-Farber, this committed community played a role in these and all the Institute's successes, and it should take pride in each one.

■ In the 1980s, Institute physician-scientists pioneered autologous ("self") **bone marrow transplantation** as a treatment for childhood leukemia. This procedure enables patients to tolerate extremely high doses of chemotherapy and radiation formulated to eradicate their disease.

■ Dana-Farber researchers found in 2001 that many cancer cells carry a surface protein called PD-L1, which staves off an attack by immune system T cells. This discovery helped launch immunotherapy drugs known as "**immune checkpoint inhibitors**" that, by blocking PD-L1 and related proteins, unleash a T-cell attack on tumor cells.

■ Institute investigators discovered in 2004 that a subset of lung cancers exhibited mutations in the **EGFR gene**, which were predictive of the clinical efficacy of EGFR kinase inhibitors. This breakthrough helped catalyze the entire field of precision medicine for patients with these diseases.

■ The Institute created **Profile** in 2011, representing the first research tool that collects and analyzes genomic data across every cancer type from consenting Dana-Farber patients—accelerating researchers' discovery of new molecular targets for therapies and enabling personalized patient treatments.

■ In 2017, Institute investigators demonstrated that a **personalized cancer vaccine** which targets distinctive "neoantigens" on tumor cells stimulates a potent, safe, and precise anti-tumor response in patients with melanoma—providing proof-of-principle of the safety and effectiveness of vaccines tailored to each patient's tumor.

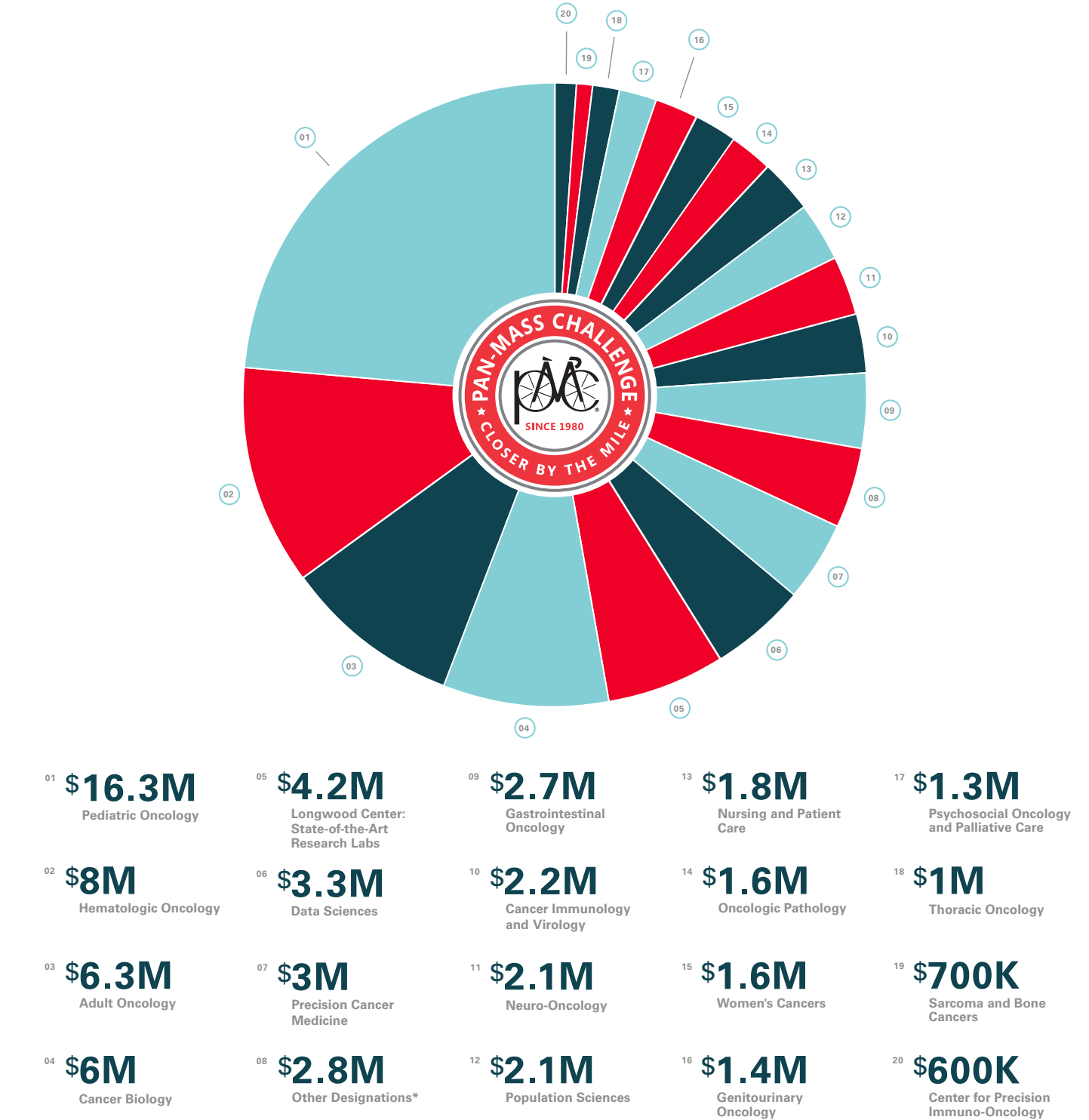
■ Following a clinical trial led by Dana-Farber investigators, the U.S. Food and Drug Administration granted its first approval for **CAR T-cell therapy** for adults with multiple myeloma in 2021.



A \$69 MILLION IMPACT

The Pan-Mass Challenge raises funds for Dana-Farber Cancer Institute and the Jimmy Fund’s lifesaving mission to conquer cancer as the Institute’s largest single donor. In 2022, committed riders, donors, sponsors, and volunteers joined together to contribute \$69 million. This chart shows how Dana-Farber allocates these funds to bring us closer by the mile.

This chart depicts rider-designated funds in addition to unrestricted funds raised, and reflects how unrestricted funds are directed in accordance with Institute budget priorities.



* including Cutaneous Oncology, Head and Neck Oncology, Imaging, Joint Ventures, Radiation Oncology and the Zakim Center



PMC IMPACT

The PMC continues to make a profound difference in the lives of patients worldwide, thanks to advances enabled by its robust support of cancer research and care at Dana-Farber. Following are some of many examples of the Institute's scientific and clinical breakthroughs in which PMC funding played a role.

■ **New Treatment for Melanoma** — In the first study of its kind, Dana-Farber researchers demonstrated that a novel immunotherapy combination showed significant benefit in treating patients with advanced melanoma.

■ **Optimizing the Immune System Against Cancer** — An unprecedented study identified several genes and molecular mechanisms that determined tumors' responsiveness or resistance to natural killer cells, which form the basis for a promising new immunotherapy.

■ **Novel Drug Target** — Institute investigators identified a new drug target in pediatric neuroblastoma, paving the way for new precision therapies for this disease and potentially others that also share this target.

■ **Enhancing Early Detection** — Dana-Farber scientists developed new blood tests that precisely detect tumor DNA in Wilms tumor, a rare pediatric kidney cancer, and in recurrent HPV-driven oropharyngeal cancer, a major advancement in finding these cancers early.

■ **Crucial Pathway Uncovered** — In a collaborative study, Dana-Farber researchers uncovered the structure of an important complex of RAS-pathway proteins, which drive tumor growth in about 25% of all cancer patients. This discovery suggests potential new binding sites for cancer drugs, a significant step forward for a historically difficult-to-target complex.

■ **Key Target Identified** — As part of an international collaboration, Dana-Farber chemists and structural biologists discovered that a gene called *FOXR2*, normally turned off in most tissues, is activated in 70% of all cancers—opening a new avenue for targeted treatments in many disease areas.

■ **Improved Genetic Testing** — Dana-Farber researchers and physicians developed a groundbreaking online tool that can accurately and rapidly

identify people who should undergo testing for inherited genetic changes which raise the risk of developing certain cancers—potentially changing how individuals are referred for genetic testing and counseling.

■ **Genomic Tumor Profiling in Pediatric Cancers** — A Dana-Farber-led study evaluating the use of molecular tumor profiling in pediatric patients revealed a high rate of genetic alterations with potential for treatment with precision cancer drugs, challenging previously held wisdom that profiling pediatric solid tumors would not yield actionable results. These findings may build the case for genomic tumor profiling as a standard of care that is covered by insurance and thus accessible to more young patients.

■ **Outpatient Program for CAR T-Cell Therapy** — Dana-Farber launched an outpatient program for CAR T-cell therapy, a potent immunotherapy that uses specially equipped versions of patients' own T cells to identify and attack tumors. The launch of the more convenient outpatient program is a milestone for a form of treatment that received FDA approval as a standard therapy just five years ago.

■ **FDA Approval of New Breast Cancer Treatment** — Dana-Farber research helped lead to the FDA approval of a PARP inhibitor drug for patients with early stage breast cancer who are at high-risk of recurrence because they carry a mutated *BRCA1* or *BRCA2* gene, providing a much-needed new treatment while strengthening the case for genetic testing at time of diagnosis.

■ **New Cancer Model** — Scientists have used the CRISPR-Cas9 gene-editing system to build cell models of melanoma "from scratch," marking the first time scientists have made a human cancer model using precisely controlled genetic engineering and starting from fully differentiated, or specialized, cells. The results shed light on key mutations in melanoma and suggest a new way to study the role of specific genes in other cancers.

REVOLUTIONARY SCIENCE

The formula is seemingly simple—more funding means more research, more treatments, and better outcomes. Yet the reality is that cancer is a complicated disease that requires bold investigations led by the brightest physician-scientists to uncover its causes and cures. Given the reluctance of some funders to support high-risk, high-reward studies, PMC resources are absolutely critical in keeping this innovative work moving forward. And as the following examples indicate, Dana-Farber is exploring a diversity of novel approaches to tackling cancer's toughest challenges.

IMMUNOTHERAPY

Immunotherapy uses the body's own defense mechanism, the immune system, to treat cancer. The pioneering work of researchers at the Institute helped launch the field in the early 2000s, and since then Dana-Farber has been at the forefront of many cancer immunotherapy advances.

For example, Dana-Farber researchers presented two-year follow-up clinical trial data at the June 2022 American Society of Clinical Oncology meeting demonstrating that a novel combination of two experimental cancer immunotherapy agents along with an immune checkpoint inhibitor is yielding promising results in patients with newly diagnosed, **aggressive** glioblastoma brain tumors. Investigators found that a significant percentage of patients had a robust response in the peripheral blood, and the drug combination was well tolerated.

The data highlights that combination immunotherapy for this disease may be an effective strategy compared to single-agent immunotherapy, which has not worked well. The two agents, INO-5401 and INO-9012, are given as an intramuscular injection to patients who have had surgery to remove as much of their tumor as possible. INO-5401 targets three glioblastoma antigens and INO-9012 helps to rev up the immune response against the tumor. These drugs are given along with cemiplimab, a PD1-inhibitor that releases the molecular brakes cancers use to suppress the immune response.

Another area of growth and promise in Dana-Farber's immunotherapy research focuses on maximizing the efficacy of **natural killer cells** (NK cells)—the first responders of the immune system—in treating hematologic, head and neck, and ovarian cancers. Recently, Institute investigators showed that activating a key immune system pathway called STING, which turns on genes that stimulate the production of proteins to fight infections and cancer, enhanced the response of NK cells against tumor cells, thus improving their therapeutic activity.

Additionally, Dana-Farber researchers explored a novel strategy to strengthen the potency of NK cells by combining them with BH3 mimetics—drugs that counteract the survival mechanism of cancer cells and push them closer to the brink of self-destruction by apoptosis, or self-inflicted cell death. By “softening” the tumor cells in this way,

investigators aim to make them more vulnerable to attack by NK cells.

DRUG DISCOVERY

Findings from lab-based research set the stage for clinical trials in which new treatments are tested in patients to determine if they are safe and effective. Bolstered by PMC funding, the Institute has built one of the largest clinical trials programs in the country, with more than 1,100 active trials, and played a critical role in developing nearly one in every four Food and Drug Administration (FDA)-approved drugs in the last 10 years. Our researchers led an array of studies in 2022 that showed encouraging results for promising new treatments, such as the following:

■ According to a Dana-Farber clinical trial, a two-drug therapy that sets certain cancer cells up for failure and then finishes them off showed encouraging activity in patients with gynecologic cancers that harbor mutations in a key gene. This finding provides proof-of-principle for the treatment's effectiveness and lays the groundwork for further studies.

■ Institute investigators demonstrated that a novel “conjugate” therapy produced a substantially better response than standard treatments in patients with ovarian cancer previously treated with platinum-based chemotherapy. Researchers noted that this result builds the case for this treatment as a standard of care that holds great potential for certain patients.

■ In a phase 2 study led by Dana-Farber researchers, a combination therapy that targets cancer cells from within and without caused tumors to shrink or stabilize in 75% of patients with recurrent or persistent estrogen receptor (ER)-positive endometrial cancer. The benefits were durable and the treatment tolerable for most patients, making the regimen a strong candidate for further testing in phase 3 trials and bringing it closer to use in the clinic.

Along with clinical trials, Dana-Farber scientists spearheaded preclinical studies to pinpoint vulnerabilities in cancer that may be exploited with targeted or combination treatments. For example, Institute scientists discovered that knocking out a protein regulator in Ewing sarcoma, a rare cancer found in the bone or soft tissue of teenagers and young adults, causes the tumor cells to shrink due to overdose of a cancer-promoting

protein. The regulator, a protein known as TRIM8, is critical to the survival of malignant cells in the great majority of Ewing tumors and therefore provides an exciting potential target for drugs.

In another laboratory study, Institute researchers uncovered a critical regulator of androgen receptor signaling that prostate cancer cells depend on for growth. The team showed that inhibiting this regulator—a protein called PRMT1—reduced androgen receptor activity and blunted its effect on cancer genes in treatment-resistant prostate tumors. The findings suggest that these tumors may be susceptible to combination inhibitors and provide a preclinical framework for developing targeted therapies.

EPIGENETICS

Thanks to recent scientific and technological advances, researchers have begun to understand the role that epigenetics plays in childhood malignancy. Epigenetics refers to changes in the way genetic material is read and processed, rather than changes to the DNA itself. Understanding these mechanisms and how they can be manipulated for therapeutic benefit is the key to the next generation of treatments for our young patients.

While childhood leukemia is largely curable, subtypes caused by MLL gene rearrangements have remained relatively resistant to treatment. This subgroup of pediatric leukemias is caused by an epigenetic error in which a portion of chromosome 11 (where the MLL gene resides) breaks off and fuses with other chromosomes to create new fusion proteins. These new fusion proteins subvert the normal function of MLL and activate a set of cancer-causing genes.

To counteract this process, Institute researchers are exploring the efficacy of menin inhibition in MLL-rearranged acute lymphoblastic leukemia (ALL) and acute myeloid leukemia (AML), and these lab studies have shown enormous potential. The abnormal fusion protein generated from MLL rearrangements interacts with certain epigenetic regulatory proteins to promote leukemia—and blocking those interactions offers a promising therapeutic approach. An agent that targets those interventions can reverse human leukemia development in research models, a strong indication they should succeed in humans as well. Currently being tested in an early phase clinical trial for adults and children with ALL and AML, this represents a major advance for pediatric AML, in particular, as a disease that has seen few new treatments in the past three decades.



PREVENTION AND EARLY DETECTION

For many years, the Institute has been a national leader in cancer prevention and early detection. Risk assessment, detection, and intervention are all taking place earlier than ever before thanks to Dana-Farber's world-class faculty and the pioneering advances they achieve with PMC support.

For example, Dana-Farber researchers developed a technology that can interpret microRNA patterns in a blood sample to predict the likelihood that an individual has or will develop ovarian cancer. MicroRNA is a small, non-coding piece of DNA that helps control where and when certain genes are activated and has been implicated in cancer development. This technology, which is based on a minimally invasive blood draw, can detect ovarian cancer before symptoms even appear and in conditions such as endometriosis and pregnancy that can confound other types of ovarian cancer tests. Catching ovarian cancer early could allow most patients to be cured and potentially help defeat disparities in ovarian cancer treatment and survival, which have been linked to race, ethnicity, socioeconomic status, and access to care.

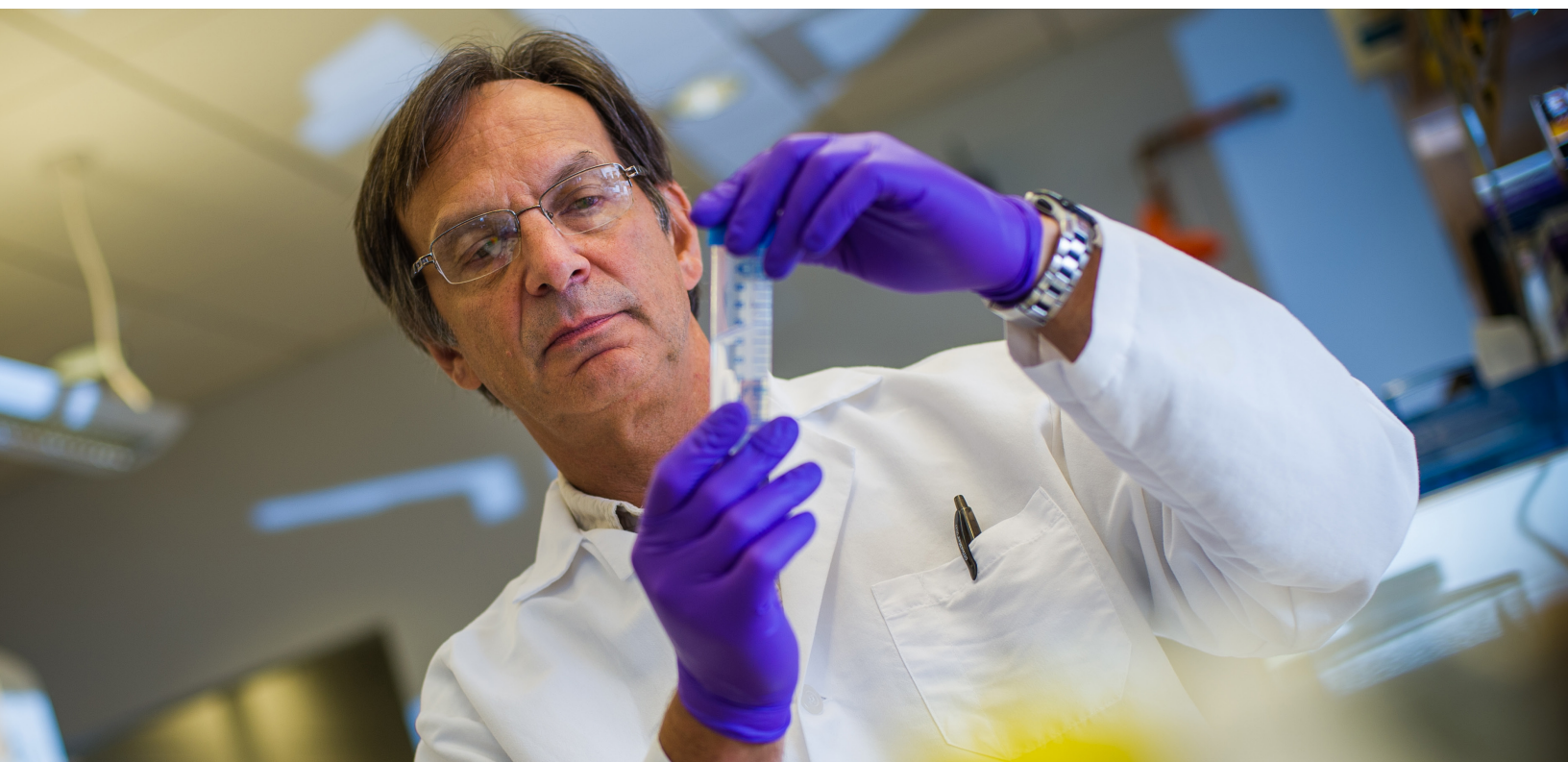
DATA SCIENCE

Established in 1977, Dana-Farber's Department of Data Science leverages the latest technologies and the expertise of biostatisticians, computational biologists, machine learning experts, and knowledge systems engineers to develop powerful tools that analyze huge amounts of complex data to advance research and benefit patients. With support from the PMC, this team collaborates with clinicians and basic scientists to create new solutions—many of which are open-source and shared worldwide.

For example, data science faculty at the Institute developed **MatchMiner**, the world's first open-source tool that maximizes clinical trial options for patients using genomic markers. Utilizing clinical data from Dana-Farber patients as well as genomic data from the Institute's signature database Profile, MatchMiner determines in real time which patients meet the clinical and genomic eligibility criteria for clinical trials at Dana-Farber and our partner hospitals.

In a study from October 2022, investigators demonstrated that MatchMiner makes this matching process for clinical trials both easier and faster. During a five-year period, the platform facilitated roughly one in every five consents to join precision medicine trials at Dana-Farber among patients with genomic data in MatchMiner. Additionally, in comparing the time between the genetic profiling of a tumor and the patient's consent, collected via MatchMiner, to participate in the trial versus consents obtained without the platform, researchers found that the time to consent for the MatchMiner group was 55 days faster than for the non-MatchMiner group, an improvement of 22%.

Dana-Farber data scientists also play a leading role in **Project GENIE** (Genomic Evidence Neoplasia Information Exchange), an international consortium of 19 cancer centers whose objective is to combine and publicly distribute the genomic and clinical data collected by participating centers. The project now has nearly 100,000 deidentified genomic records from patients with more than 100 major cancer types—offering an enormous resource for research.





Dana-Farber's Center for Global Cancer Medicine (CGCM) strives to reduce the global cancer burden in resource-limited settings, like Haiti (pictured), by developing oncology care delivery systems that aim to build capacity through teaching, professional development, and research.

Photo credit: Cecille Joan Avila for Partners In Health

NATIONAL AND GLOBAL IMPACT

Simply put, what happens at Dana-Farber touches the lives of patients everywhere. Talented physician-scientists from across the globe train in Dana-Farber's renowned fellowship programs and go on to anchor the Institute's "deep bench" of faculty or bring what they learned wherever they serve. Discoveries in Institute labs accelerate new care protocols worldwide. And Dana-Farber spearheads efforts to share knowledge, alleviate health disparities, and improve outcomes globally. The Institute's impact grows every day—and it all happens with the help of PMC.

■ Dana-Farber serves as the lead Institution in the **GAIN** (Genomic Assessment Informs Novel therapy) Consortium, which combines the strengths of 13 pediatric oncology academic medical centers across the United States to maximize the use of molecular diagnostics in treating children with cancer. GAIN's signature initiative is **iCAT2** (Individualized Cancer Therapy 2), a pediatric cancer precision medicine trial that was launched at the Institute and is one of the largest studies in the country dedicated to developing personalized treatment strategies for young patients.

■ The Institute's **Center for Global Cancer Medicine** (CGCM) plays a leadership role in reducing the cancer burden in and bringing critical oncology services to resource-limited countries like Rwanda and Haiti. The CGCM is helping to build capacity and provide clinical support at Butaro Cancer Center of Excellence (BCCOE) in Rwanda by developing patient education booklets on a variety of cancers to improve understanding of the diseases, treatments, and potential side effects of therapy; supporting the addition of new chemotherapy drugs to the BCCOE formulary, a list of drugs that offer the most effective therapy possible for a disease; and providing an ongoing training program in nursing oncology to nurses new to oncology

from Rwanda and other African countries, to increase knowledge and specialized clinical skills to improve the safety and quality of oncology care.

Additionally, the team is bolstering cancer research and care at University Hospital of Mirebalais, the only provider of free cancer services in Haiti, by conducting weekly tumor boards and by creating a core lecture series for clinicians that forms a basics-of-oncology course. In parallel, CGCM faculty conduct clinical research and offer mentorship to in-country investigators on studies such as breast cancer outcomes and identifying barriers to treatment.

■ Dana-Farber signed a cooperation agreement with **L'Institut Servier, Gustave Roussy** in Villejuif, France to foster exchange and develop bilateral collaboration among researchers. This exciting partnership brings together two world leaders in cancer research and care, and includes the organization of annual conferences and the establishment of a fellowship program for young researchers from Gustave Roussy, who will be hosted in Dana-Farber research labs.

■ The **Jesus Christ Hospital Network** in Cincinnati, Ohio, became the newest member of the Dana-Farber Brigham Cancer Care Collaborative, marking the Institute's first relationship in the Midwest and extending its world-class cancer research and care to more patients on a national level.

■ Dana-Farber is partnering with the **St. Jude Children's Research Hospital** and the **Broad Institute of the Massachusetts Institute of Technology** to accelerate the identification of vulnerabilities in pediatric cancers and translate them into better treatments, speeding the pursuit of cures globally.

EXTRAORDINARY CARE

No one should have to face a cancer diagnosis. But if they do, then they deserve the very best in compassionate, personalized, and equitable care imaginable. For more than three quarters of a century, Dana-Farber has been able to provide such world-class care because of generous partners like the PMC. Today, the PMC upholds the Institute's clinical excellence and capacity to meet the comprehensive needs of people with cancer by supporting special programs for patients, families, and survivors that may not be covered by insurance but are essential to the healing process. Below are some examples of integral services strengthened by funding from the PMC.

■ **Leonard P. Zakim Center for Integrative Therapies and Healthy Living** – Inspired by Lenny Zakim's commitment to ensuring that everyone benefits from integrated therapies as he did when he was a patient at Dana-Farber, the Zakim Center offers acupuncture, massage, and Reiki; group programs such as movement, meditation, and creative arts; and exercise and nutritional consultations—all of which have been shown to improve patients' quality of life and reduce stress and side effects. The Center has also grown into an international leader in complementary medicine, and regularly conducts research to advance our understanding of the effectiveness and outcomes of integrative therapies.

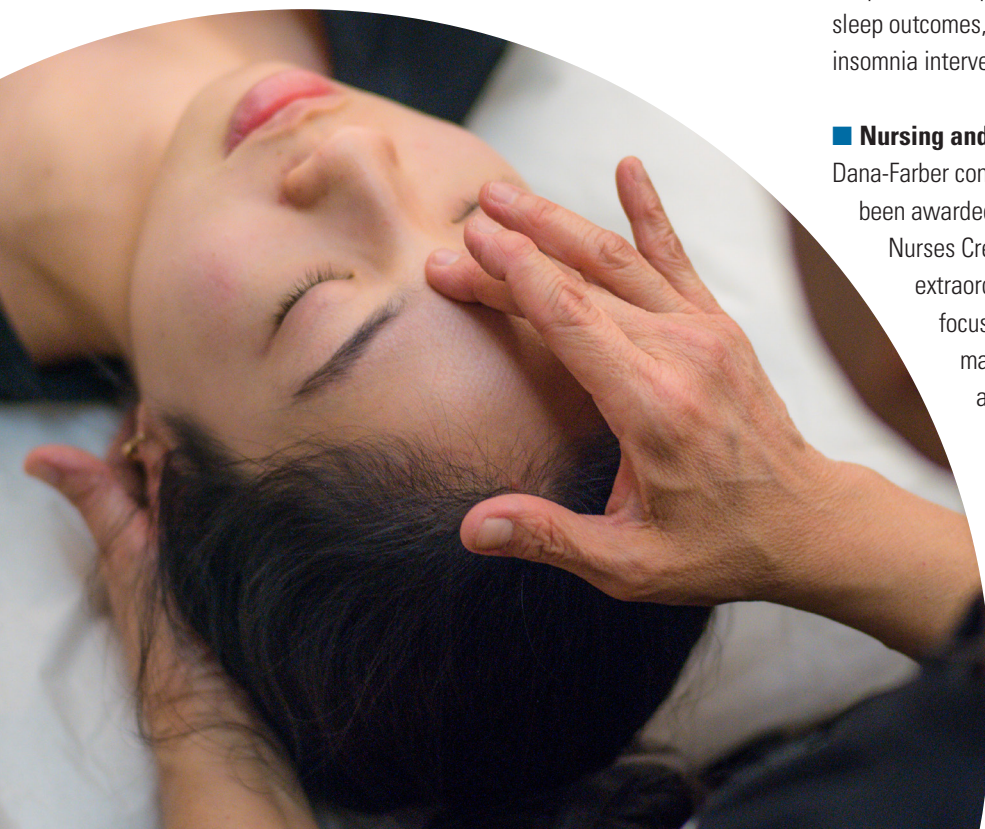
In order to maximize patient access to these services, Zakim Center staff have worked to bring programming outside of the Center's physical space to waiting areas, treatment rooms in the clinic, and online. As a result, participation numbers have been strong and are growing—from October 2021 through September 2022, there were 9,467 total live class visits and 79,180 total on-demand visits. And with steady support from the PMC, the Center will continue to expand its services so they reach even more Dana-Farber patients, families, and staff.

■ **Perini Family Survivors' Center** – Because of progress made possible by supporters like the PMC, the number of cancer survivors grows each year, as does the demand for programs to help them live better and longer. Dana-Farber is a global leader in this field thanks to the **Perini Family Survivors' Center**, which includes the **David B. Perini Jr. Quality of Life Clinic**—one of the nation's first programs dedicated to young cancer survivors—and the **Adult Survivorship Program**. With funding from the PMC, the Perini Center provides comprehensive, individualized, and ongoing patient care while accelerating research to better understand and alleviate the medical, emotional, and psychological challenges facing survivors.

For example, Institute investigators have made strides in advancing new ways to alleviate sleep-related issues in cancer survivors. After leading studies that elucidated the extent to which survivors suffer from insomnia, Dana-Farber's team created an online sleep program that educates users in how insomnia develops and how it can be overcome. The researchers found that the program was broadly effective and have made strides in tailoring it to the specific needs of different patient populations. This effort included the development of a novel culturally adapted online program for Black women that significantly improved sleep outcomes, making it the first cognitive behavior therapy for insomnia intervention adapted for a traditionally underserved group.

■ **Nursing and Patient Care** – Bolstered by funding from the PMC, Dana-Farber continually earns recognition for nursing excellence, having been awarded the prestigious Magnet® status by the American Nurses Credentialing Center four times. Along with providing extraordinary care, nurses at the Institute are advancing research focused on the patient experience, symptom science and management, interventions, survivorship, health disparities, and outcomes.

In June 2022, Dana-Farber held a virtual weeklong program highlighting more than 100 studies, projects, publications, and presentations by Institute nurse-scientists on topics ranging from the use of cannabis in oncology, to the practice of telemedicine during the COVID-19 pandemic, to novel techniques for pain management, to serious illness conversations. The featured studies showcased the breadth



and depth of nursing research at Dana-Farber and exemplified the commitment of Institute nurses to continuous improvement in patient care protocols, digital health tools, and educational opportunities.

■ **Psychosocial Oncology and Palliative Care** — Dana-Farber's Department of Psychosocial Oncology and Palliative Care (POPC) is one of only a few such departments in the United States where palliative care, psychosocial oncology, social work, and research are fully integrated. The Institute is also at the forefront of innovation in this field, launching one of the world's first efforts to apply artificial intelligence and natural language processing to improve access to specialized cancer care.

With the help of funding from the PMC, Dana-Farber is providing personalized, equitable support to patients across the entire continuum of care today while accelerating groundbreaking projects to shape the future of POPC. This includes the development of new tools and strategies for increasing access to POPC services, enhancing patient communication with clinicians, improving symptom management, proactively identifying patients in need of additional supportive care, and easing the physical and emotional burdens of living with cancer.

For example, the Institute is piloting a new care model in which supportive specialists work alongside oncology clinicians as early as

possible in a patient's disease trajectory. This approach has already shown promise in connecting patients to supportive services at a higher rate. As a result, Dana-Farber's POPC team is working to expand this model across the Institute and, crucially, to community locations beyond the Longwood campus, ensuring that all patients have the same access to supportive care.

In parallel, Dana-Farber is exploring ways to leverage advanced technologies to improve the experience of living with cancer. Investigators have developed a screening tool that leverages artificial intelligence and natural language processing to identify patients who could benefit from palliative or psychosocial intervention. This technology would scan physicians' notes for keywords that signal a need for supportive care—a groundbreaking tool that would be the first of its kind in the field. Additionally, Dana-Farber pioneered PediQUEST (Pediatric Quality of Life and Evaluation of Symptoms Technology), a symptom and quality of life reporting app that empowers young patients to routinely communicate with their oncology team. While such symptom reporting is standard in adult care, it is a novel paradigm for pediatric patients. Clinical trials are underway to test the efficacy of coupling this app with the early integration of a palliative care counseling team and potentially build the case for incorporating this dual approach as a standard of care.



WORLD-CLASS DANA-FARBER CARE EXTENDS TO FOXBOROUGH

In August 2022, Dana-Farber opened Dana-Farber Brigham Cancer Center—Foxborough. The new 30,000-square-foot space is located at Patriot Place and enhances the Institute's presence in central and southern Massachusetts. The facility features 28 infusion bays, 14 exam rooms, medical oncology and hematology care, a clinical lab and pharmacy, clinical trials, and support services such as nutrition and social work.

INCLUSION, DIVERSITY, AND EQUITY

Despite enormous progress in cancer research, prevention, and treatment over the past decade, historically marginalized populations continue to bear a disproportionate burden of cancer occurrence and death in the United States. Like the PMC, Dana-Farber strongly believes that cancer outcomes should not be defined by one's neighborhood, race, ethnicity, or income. And with PMC support, the Institute is doing whatever it takes to ensure that everyone benefits from the very best in cancer education, detection, prevention, and treatment. Strengthened by PMC funding, Dana-Farber has launched new partnerships and programs while growing existing efforts to improve inclusion, diversity, and equity in cancer medicine. Following are examples of how the Institute is enhancing access to care, leading in cancer disparities research, and expanding access to careers and advancement.

■ **Cancer Care Equity Program (CCEP)** – The CCEP places Dana-Farber at the forefront of efforts to eliminate cancer disparities and improve health outcomes in medically vulnerable communities, both locally and nationally. Launched in 2012, the CCEP mobilizes a multidisciplinary team of researchers and health care practitioners to bring high-quality cancer care to medically underserved populations in Boston neighborhoods, providing streamlined access to high-quality cancer prevention and treatment services and to clinical trials that test new therapies.

■ **Patient Navigation** – The Institute's patient navigation program promotes access to timely diagnosis and treatment of cancer by striving to eliminate financial, insurance, and language barriers to care. Patient navigators, who are either from or are very familiar with the communities or neighborhoods of the patients they are supporting, build trust and guide patients and their families through the complexities of cancer screening and care in a culturally sensitive manner.

■ **Mammography Van** – The only mobile mammography program in the state, Dana-Farber's Mammography Van features state-of-the-art imaging technology, a private reception area for check-in, and real-time

imaging transmission to radiologists at Dana-Farber's main campus. Together, these features enhance the patient experience during and after screening, with 1,702 screenings performed in the new van, including six that resulted in breast cancer diagnoses that might have otherwise been delayed or missed.

■ **Blum Family Resource Center Van** – Skin cancer, the most common form of cancer, is highly preventable by practicing sun safety and early detection of abnormalities. Since 2004, the Blum Family Resource Center Van has been bringing Dana-Farber's Sun Safety/Skin Cancer Prevention Program to Boston area beaches, workplaces, high schools, and colleges. In 2022, the program conducted 19 skin cancer screening and educational events, during which 801 individuals were screened by a board-certified dermatologist from Brigham & Women's Hospital, and 182 were referred for a follow-up visit because the screening dermatologist saw something concerning. Additionally, the team provided educational services to 112 individuals from a diversity of demographics, including a large Spanish-speaking population at Charles River and Madison Park, people without housing at the Boston Public Library, and elderly at Madison Park.



Christopher Lathan, MD, MS, MPH, serves as Dana-Farber's Chief Clinical Access and Equity Officer, Hadley Family Chair at Dana-Farber, and is Faculty Director for the Cancer Care Equity Program, leading the Institute's efforts to expand its world-class care and make cancer treatment and research more inclusive and equitable.

■ Research and Intervention to Alleviate Poverty's Impact on Patient Outcomes –

Investigators from Dana-Farber/Boston Children's Cancer and Blood Disorders Center led a groundbreaking study showing that children with high-risk neuroblastoma had worse outcomes if they were from certain racial/ethnic groups or were on public rather than private insurance, despite being treated in clinical trials with standardized protocols. This disparity in outcomes demonstrated an urgent need for poverty-targeted interventions to be integrated into clinical drug trials.

In response, Dana-Farber's team developed and launched a first-of-its-kind intervention targeting two aspects of material hardship—transportation and food security—by providing newly diagnosed families at Dana-Farber and a partnering medical center with groceries from online delivery services and transportation in the form of ride services or gas and parking. After receiving this support, participants reported reduced anxiety about putting food on the table and traveling to doctors' appointments.

■ Novel Study of Outcome Disparities in Prostate Cancer –

Dana-Farber launched a new project in partnership with Rutgers University Cancer Institute to investigate what it is about neighborhood environments that may increase outcome disparities in prostate cancer, a disease which Black men are already more than twice as likely to die from as white men. The researchers aim to leverage study findings to design and simulate interventions that inform policymakers on what to do to reduce the prostate cancer racial inequity and which areas most urgently need to be targeted.

■ Support for Early Career Faculty and Staff –

Dana-Farber is committed to ensuring that every member of its world-class workforce can access the opportunities, training, and support needed to reach their full potential. This includes talented early career faculty and staff members who come from a range of historically underrepresented or marginalized communities and who may not have had access to the kinds of educational opportunities and professional networks that drive career advancement. To help meet this need, the Institute offers several professional development short courses and workshops on topics such as career building, mentoring, work/life balance, and how to seek funding—all heavily subscribed and many with long waitlists of eager staff members. Additionally, Dana-Farber provides grant-based programs and opportunities that help early career investigators pursue their research and build their professorial reputations.



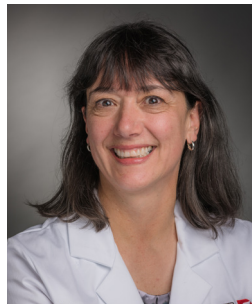
EXCEPTIONAL EXPERTISE

The PMC plays a paramount role in empowering the Institute to mobilize top-tier talent by supporting faculty and staff recruitment and retention at Dana-Farber. Bolstered by PMC funding, the Institute is attracting the brightest minds in cancer medicine from around the world to drive influential advances here or wherever they serve. At the same time, resources from the PMC help Dana-Farber to invest in its existing human capital, enabling our dynamic researchers and dedicated caregivers to build their careers, fill key leadership positions across and beyond our labs and clinics, and anchor the Institute's life-changing work for years to come.

Below is a sampling of faculty and staff who earned recognition for excellence in their fields. Their achievements demonstrate the strength of Dana-Farber's people and exemplify how they continually make the most of PMC investment.



Laurie H. Glimcher, MD
was named to *Modern Healthcare's* 50 Most Influential Clinical Executives class of 2022, which includes individuals in health care who are deemed by their peers and the senior editors of *Modern Healthcare* to be paving the way to better health.



Monica Bertagnolli, MD
a world-renowned surgical oncologist at Dana-Farber Brigham Cancer Center, was named director of the National Cancer Institute, the country's largest biomedical research institute.



Margaret Campbell, BSN, RN
was awarded the 2022 Extraordinary Healer Award by *CURE*, one of the largest publications covering the world of cancer care.



Narjust Duma, MD
associate director of Dana-Farber's Cancer Care Equity Program, was named associate editor of diversity, equity, and inclusion for the *Journal of the American Medical Association (JAMA) Oncology*.



Irene Ghobrial, MD
received the prestigious William Dameshek Prize, which is given annually by The American Society of Hematology (ASH) to an individual, younger than 50, who has made outstanding contributions in hematology.



Carino Gurjao, MSc
was named to *Forbes Healthcare's* 2022 30 Under 30 list for his role in the Giannakis Lab at Dana-Farber, which identified a mutational link between red meat and colorectal cancer.



Pasi Jänne, MD, PhD
received the 50th Griffuel Award from the ARC Foundation for Cancer Research in France for his work in EGFR-mutant lung cancer and role in co-discovery. The award is one of the most prestigious prizes in the field of cancer research in Europe and honors researchers whose work has led to a major breakthrough in basic, translational, or clinical oncology research.



Some members of the stem cell transplant leadership team. From left: Janet Bagley, MS, RN, AOCNS, NEA-BC; Robert Soiffer, MD; Catherine J. Wu, MD; and Amy Emmert.

FACULTY BY THE NUMBERS

694

Research and Clinical Fellows

166

Principal Investigators

110

Dana-Farber-affiliated faculty named as “Top Doctors” on *Boston* magazine’s annual list

33

Faculty on the Highly Cited Researchers list of 2022

17

National Cancer Institute Outstanding Investigators

13

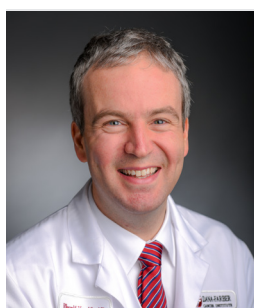
National Academy of Sciences Members

2

Nobel Prize winners

DANA-FARBER’S BONE MARROW/STEM CELL TRANSPLANT PROGRAM

was recognized by the Center for International Blood and Marrow Transplant Research—a research organization that maintains the international transplant registry and is closely aligned with the National Marrow Donor Program—for achieving outcomes that rank in the top 10% of U.S. centers based on survival rates, despite performing the lifesaving procedures on patients who might be considered too high-risk elsewhere.



Eliezer Van Allen, MD, and Nikhil Wagle, MD

were awarded the Trailblazer Prize for Clinician-Scientists by the Foundation for National Institute of Health, which recognizes the outstanding contributions of early career clinician-scientists whose research translates basic scientific observations into new paradigm-shifting approaches for diagnosing, preventing, treating, or curing disease and disability.



THANK YOU FOR YOUR POWERFUL PARTNERSHIP

Bringing cures for cancer closer by the mile requires a committed community, pushing forward together, for maximum momentum. For 43 years and counting, the PMC has provided that powerful force for progress at Dana-Farber, driving advances across the Institute's labs and clinics that are creating better care and outcomes for patients locally, nationally, and globally. This means more birthdays and celebrations, more time with family and friends, and more special moments to cherish—all because of the PMC. Every rider, volunteer, sponsor, and supporter should be proud of the life-changing impact of their dedicated efforts and know how very grateful the entire Dana-Farber community remains for their strong partnership.



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Road

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Medical



**THE MISSION OF DANA-FARBER
CANCER INSTITUTE IS TO PROVIDE
EXPERT, COMPASSIONATE, AND
EQUITABLE TO CHILDREN AND ADULTS
WITH CANCER WHILE ADVANCING
THE UNDERSTANDING, DIAGNOSIS,
TREATMENT, AND PREVENTION OF
CANCER AND RELATED DISEASES.**



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FARBER CANCER INSTITUTE VIA THE
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THAN ANY OTHER SINGLE ATHLETIC
FUNDRAISER IN THE COUNTRY.**

