



Annual Plan & Professional Judgment Budget Proposal for Fiscal Year 2027

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EXECUTIVE SUMMARY

Thanks to advances in prevention, screening, and treatment, U.S. cancer mortality rates have progressively decreased for more than 30 years, and childhood cancer mortality rates have decreased even faster. This has resulted in a more than one-third decrease in age-adjusted cancer mortality rates. Since 2000, there have been notable improvements in patient outcomes for several common cancers that traditionally had poor prognoses. These include ovarian cancer, which now has a 5-year survival rate that is more than 50%,¹ and lung cancer, whose incidence decreased by more than 30% while its 5-year survival rate almost doubled.² These advances also mean that the number of cancer survivors is increasing. There are over 18 million cancer survivors today, which is more than 5% of the US population; this number is projected to reach 26 million by 2040.³

Because of these advances, approximately 300,000 Americans who would have died from cancer at 1990 mortality rates will not die from cancer this year.⁴ However, about 600,000 people will succumb to cancer this year, which indicates the magnitude, urgency, and need to make further progress against this terrible disease.⁵ Furthermore, the advances have not been uniform for all populations. For example, mortality rates for urban populations have decreased faster than for rural populations, creating a new cancer disparity, while Black men and women continue to have higher incidence and mortality rates for several cancer types. Supporting research to narrow these gaps is an important goal for NCI.

[The Fiscal Year 2027 \(FY27\) Professional Judgment Budget](#) presents NCI's assessment of the optimal funding to support the National Cancer Program and help all people live longer, healthier lives. FY27 presents an opportunity for Congress to sustain robust cancer research for the United States, including new funding to modernize and expand cancer clinical trials, increase investments in cancer research grants, ensure a robust future workforce, and develop new ways to prevent cancer and detect it earlier.

There are many opportunities for continued progress. For example, though most anti-cancer drugs are first approved by the FDA as single agents, drug combinations can produce even better outcomes. Evaluations of such regimens have led to recent approvals for new combinations to treat several cancer types, including multiple myeloma, follicular lymphoma, and urothelial carcinoma.

NCI drives progress across the cancer continuum with a long-standing commitment to invest in a broad portfolio of promising, strategic, and rigorous cancer research to prevent and improve cancer care and outcomes for all Americans.

The estimated FY27 budget from NCI supports a balanced [cancer research portfolio](#) that saves lives today while building toward tomorrow's innovations. NIH is shifting to fully funding research grants up front, improving flexibility and long-term planning for investigators. To maintain the same number of awards and ensure stability during this shift, NCI anticipates needing an increased budget in FY27.

NCI remains committed to supporting basic science research that unlocks insights into the causes of cancer, cancer biology, and novel targets for intervention, as well as sustained investments in data infrastructure crucial for further accelerating discoveries from basic research to clinical science that directly benefit patients. NCI invests in the ideas, workforce, and infrastructure that sustain cancer research across the country using rigorous, transparent, and trustworthy science. As responsible stewards of federal funding, NCI balances its research portfolio and provides strong oversight to ensure that research directly benefits the American public. Meaningful progress against cancer requires sustained funding growth so NCI can act upon existing and emerging [scientific opportunities](#) and build on discoveries made from previous investments.

Cancer does not wait, so neither can we: the opportunities and pressing challenges in cancer research must be supported in FY27 to increase our understanding of how cancer develops and where we can intervene to discover better ways to prevent, detect, diagnose, and treat this disease.

NCI FISCAL YEAR 2027 PROFESSIONAL JUDGMENT BUDGET PROPOSAL

The Fiscal Year 2027 (FY27) Professional Judgment Budget presents NCI's assessment of the optimal funding to support the National Cancer Program and help all people live longer, healthier lives. FY27 presents an opportunity for Congress to sustain robust cancer research for the United States, including new funding to modernize and expand cancer clinical trials, increase investments in cancer research grants, ensure a robust future workforce, and develop new ways to prevent and detect cancer earlier.

NCI FISCAL YEAR 2027 (FY27) PROFESSIONAL JUDGMENT BUDGET PROPOSAL (DOLLARS IN MILLIONS)

FY25 NCI Appropriation	\$7,224	
Estimated Increase over FY25 NCI Appropriation* (Allocation by category)	\$4,313	\$1,000 Cancer Biology Research \$575 Cancer Prevention & Control Research \$846 Cancer Detection & Diagnosis Research \$1,718 Cancer Treatment Research \$174 Training & Infrastructure
FY27 TOTAL	\$11,537	

*This increase includes funding to maintain the same number of awards as FY24 and ensure stability during the NIH's transition to fully funding research grants up front.

NCI is the largest funder of cancer research in the world, providing foundational support that fuels novel discovery, technical innovation, economic growth, and hope. NCI funding is distributed across the United States in both academic and community settings. Meaningful progress against cancer requires sustained funding increases so NCI can act upon existing and emerging opportunities and build on discoveries made from previous investments. Support for these opportunities will increase our understanding of cancer biology and spark the discovery of better ways to prevent, detect, diagnose, and treat cancer.

This budget estimate will enable NCI to fully leverage the scientific opportunities before us to prevent, detect, and treat cancer, while sustaining the cancer research workforce. The return on this investment will be a stronger cancer research enterprise that maximizes research advances to empower progress against cancer for all people.

NCI RESEARCH PORTFOLIO: DRIVING DISCOVERY TO END CANCER AS WE KNOW IT

NCI enables advances against cancer by investing in a [broad portfolio of research](#), supporting the [cancer research workforce](#), and sustaining the [infrastructure that enables cutting-edge research to succeed](#). All these components are essential to lead progress against cancer and accomplish the goals of the [National Cancer Plan](#).

NCI's support of basic, translational, and clinical research is helping to reduce the burden of cancer by driving discovery to improve cancer risk assessment, prevention, detection, diagnosis, treatment, and survivorship. Sustained and robust support for NCI's work is needed to realize the long-term vision of ending cancer as we know it for all populations.



Providing hope: The power of cancer biology research

Virtually every new cancer diagnostic, therapeutic, or preventive measure begins with addressing a basic science research question. Through decades of carefully planned experiments in laboratories across the country, researchers generate fundamental knowledge that often cuts across multiple types of cancer. It's these investments in cancer biology research that support the groundwork needed to discover and advance lifesaving cancer interventions. Continued support is then required to build on these findings.

NCI is the largest funder of the basic research that is critical for making sustained progress against cancer. Cancer survivors and those at risk of developing the disease rely on the innovative approaches that cancer biology research delivers.

For example, through cancer biology research, NCI-supported researchers have:

- pinpointed a specific type of [bacteria linked with colorectal cancer](#), which could inform new strategies for cancer screening and treatment

- mapped [interactions between tumor cells and their environment](#) in stomach cancer to improve our understanding of how the disease advances
- updated long-held beliefs about cell division that could [change the way we treat some fast-growing tumors](#)
- identified an unexpected way tumor cells hide from the immune system, revealing a new target to help expose the cancer to immune cells

Discoveries like these, and many others, open the door to new cancer prevention, interception, and treatment options where few or none currently exist and provide hope that one day all cancers will be treatable.

Read more about NCI's related research areas, including [cancer biology research](#), [cancer genomics research](#), and [research on causes of cancer](#).

Reducing the burden: The potential of cancer prevention

While overall cancer mortality continues to decrease, researchers estimate that more than half of cancer deaths are preventable. More research investments are needed to learn how to implement, improve, and build on current prevention strategies and intercept cancer more effectively by improving treatment of precancerous lesions.

Researchers have identified several preventable factors in cancer development, such as health behaviors, exposure to cancer-causing agents, and social determinants of health. However, there is still much more to learn about how changes in these risk factors influence cancer risk. The knowledge gained from cancer prevention research can be used to refine guidelines and implement targeted measures to reduce the incidence of cancer.

For example, NCI-funded researchers are investigating new ways to prevent precancerous conditions from progressing to cancer and new ways to improve cancer screening in underserved areas. This research has enabled progress in several areas. NCI-supported groups have:

- shown that treating a precancerous anal condition in people with HIV [reduces their risk of anal cancer](#) by more than half
- launched the [SHIP Trial Network](#) to evaluate a self-collection method for human papillomavirus (HPV) testing as a way to screen for cervical cancer, especially among underserved and under-screened people
- found that [simple reminders can increase the number of patients who complete follow-up testing](#) after an abnormal cancer screening result, which aids in cancer prevention and early intervention
- [improved breast cancer risk prediction tools for Black women](#), who have a 40% higher rate of breast cancer death than White women, by adding genetic information to the traditional questionnaire-based factors that can inform screening decisions

Through rigorous scientific studies, researchers can assess the impact of cancer prevention strategies, identify areas for improvement, and develop more efficient and accessible intervention approaches to reduce the burden of cancer.

Read more about NCI's related research areas, including [cancer prevention research](#).

Intervening early: The urgency of cancer detection and diagnosis research

Imagine if fewer people suffered and died from cancer because we detected and diagnosed the disease or its precursors at the earliest possible stage.

Accurately identifying cancer—and precancerous lesions—and assessing its severity is the primary goal of cancer detection and diagnosis research. Early detection can save lives. An imprecise approach, however, can lead to overdiagnosis, overtreatment, and unnecessary physical, psychological, and financial harm.

Investing in cancer detection and diagnosis research can help develop more sensitive, accurate, and cost-effective methods that provide information about not only the cancer type but also detailed genetic information to support targeted cancer therapies and precision medicine. This research can also establish the impact that screening could have on survival rates for selected cancer types. With the rise of multi-cancer detection tests, [NCI launched the Cancer Screening Research Network](#) to evaluate potential survival benefits, or other outcomes, from this new type of tool.

With recent advances in NCI-funded detection and diagnosis technology, scientists have capitalized on novel opportunities. For example, NCI-supported researchers have:

- developed a [noninvasive method of detecting colorectal cancer](#) using engineered bacteria that can sense DNA shed by tumors into the gut
- identified [four key warning signs](#) that could help health providers find colorectal cancer at an earlier and more treatable stage in younger adults, a population that has experienced rising rates of colorectal cancer over the last few decades
- overcome the challenge of assembling a large and diverse data set for a rare brain cancer called glioblastoma, enabling the creation of an [AI model that can more accurately detect tumor boundaries](#) prior to surgery
- developed a urine-based test that can [distinguish between slow-growing prostate cancers that pose little risk and more aggressive cancers](#) that need treatment, potentially helping some people avoid unnecessary procedures

Cancer detection and diagnosis research is primed with these emerging technologies. Carefully assessing their impact on cancer outcomes will limit risk and ensure benefit from these new screening and detection methods.

Read more about NCI's related research areas, including [cancer screening and early detection research](#) and [cancer diagnosis research](#).

Innovating treatment: The need for more effective and less toxic cancer therapies

For more than 50 years, NCI has played a vital role in the development of more effective and less toxic therapeutic options for patients with cancer. Despite the steady progress in improving treatments, some forms of cancer still lack effective therapies, many cancers eventually develop resistance to treatment, and not all people have equal access to cutting-edge treatments. Adding to the challenge, patients with cancer often experience severe side effects from the disease and its treatment, which for childhood cancer survivors can impact their quality of life for decades.

These challenges can be overcome. Investments in treatment research today will inspire and sustain the safe and effective cures of tomorrow. For example, NCI-supported researchers have:

- pioneered groundbreaking research using lymphocytes (a type of immune cell) from a person's own tumor to treat their advanced melanoma, [garnering FDA approval of a first-of-its-kind personalized treatment](#)
- completed a clinical trial that led to the [first FDA approval of an immunotherapy for advanced alveolar soft part sarcoma](#), a rare soft tissue cancer that requires frequent surgeries and affects mostly adolescents and young adults
- developed a [targeted drug combination to treat patients with a rare type of brain tumor](#) called a papillary craniopharyngioma, potentially eliminating the need for surgery or radiotherapy

- conducted the MIRASOL trial, which led to FDA approval of a novel therapy to [improve overall survival in people with advanced ovarian cancer](#) that had stopped responding to standard chemotherapy

More research is needed to ensure that all patients with cancer have safe and effective therapies and the highest possible quality of life.

Read more about NCI's related research areas, including [cancer treatment research](#) and [research on childhood cancers](#).

Improving public health: The role of cancer control and health care delivery research

Each year, cancer has a significant impact on public health, affecting the nation's economy and the quality of life for millions of people in the United States. NCI invests in studies to identify population-wide trends in cancer and to improve the delivery of cancer interventions. NCI also supports research that enables people to live a healthy life after cancer.

More research is needed to design interventions that improve cancer prevention, screening, treatment, and survivorship outcomes and to address why certain racial, ethnic, and rural populations suffer disproportionately from some cancers. This research can inform policies that reduce cancer-causing exposures, ensure greater compliance with health recommendations, minimize misinformation, and address gaps in the health care system when cancer survivors transition from oncology care to primary care.

Additional investments in cancer control and implementation research will improve the lives of cancer survivors and the general population, while ensuring that all population groups benefit from advances in cancer research. For example, NCI-supported groups have:

- estimated that [more than 15,000 deaths could be prevented](#) if 10% more of the eligible U.S. population used lung, colorectal, breast, and cervical cancer screening tests
- revealed gaps in public awareness that drinking alcohol of any type raises the risk of cancer, a finding that can support [efforts to reduce the health impact of alcohol](#)
- launched the Persistent Poverty Initiative to help [alleviate the cumulative effects of persistent poverty on cancer outcomes](#) by building research capacity, fostering cancer prevention research, and promoting the implementation of community-based programs
- discovered that [the right side of the colon ages significantly faster](#) than the left side in African Americans, possibly explaining why these individuals are more likely to suffer from right-sided colon cancer, which doesn't respond as well to conventional chemotherapies

Researchers are working hard to understand population-level impacts on cancer control and to design and test interventions along the cancer continuum that can address disparities and ensure good health for all people.

Read more about NCI's related research areas, including [public health research and cancer](#) and [cancer health disparities](#) research.

Strengthening the research enterprise: The need for a robust cancer research workforce and infrastructure

An extensive research infrastructure and a stable workforce comprise the backbone of the entire cancer research enterprise, and NCI provides a level and scope of infrastructure and training that cannot be matched by other organizations. Investing in these critical needs is of the greatest importance in leading progress against cancer.

All cancer research requires a robust workforce and infrastructure. This includes [cancer centers](#) where [clinical trials can test new approaches](#) to prevent and treat cancer, [facilities](#) that develop and manufacture novel technologies and medicines, [electronic databases](#) to support large amounts of biomedical data, and programs and initiatives to train a workforce that drives cancer research forward.

These elements need continued investments to remain strong and capitalize on new opportunities. With continued investments, NCI has:

- launched the new [Virtual Clinical Trials Office](#), an effort to accelerate nationwide participation in cancer clinical trials with remote clinical research support staff who assist teams in community-based and remote settings
- supported the next generation of cancer researchers through the [K99/R00 Pathway to Independence Program](#), which helped 95% of surveyed award recipients transition from postdoctoral research to research independence
- engaged more than 500 middle-school, high-school, and undergraduate students and their teachers through a Youth Enjoy Science (YES) Research Education Program at the University of Nebraska Medical Center, [increasing representation of Native Americans in pursuit of cancer careers](#)
- released a [comprehensive data set that combines molecular and clinical data](#) from individual studies of more than 1,000 tumors across 10 cancer types, which is publicly available through NCI's cloud-based Cancer Research Data Commons

Investing in the NCI-supported cancer research workforce and infrastructure ensures that all research areas supported by the NCI budget produce the highest quality research in the most effective way possible.

Read more about NCI's [cancer research infrastructure](#) and the [Center for Cancer Training](#).

SCIENTIFIC OPPORTUNITIES IN CANCER RESEARCH

Meaningful progress against cancer requires NCI to continually pursue existing and emerging scientific opportunities.

Building upon previous advances, researchers have more avenues to make progress against cancer than ever before. Read about four important areas of opportunity for fiscal year 2027.

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- [Delivery of Clinical Trials to All Americans](#)
 - [Investments in Foundational Research Grants and Training](#)
 - [Cancer Prevention](#)
 - [Early Detection and Screening](#)

Delivery of Clinical Trials to All Americans

NCI supports the cancer clinical trials infrastructure that serves as the nation's backbone for testing innovative cancer therapies and accelerating the delivery of promising treatments and prevention strategies. NCI programs expand clinical trial opportunities beyond major academic cancer centers, ensuring patients can enroll in a clinical trial wherever they live. Through a system of complementary clinical trial networks, individuals in all 50 states, the District of Columbia, Puerto Rico, and Guam can participate in cutting-edge research and access cancer care. Additionally, NCI holds a unique role in supporting clinical trials that the private sector does not, such as for patients with pediatric cancers or rare adult cancers, who may otherwise not have options for potential new therapies.



Today's clinical trials lead to tomorrow's improved standard of care for cancer prevention and treatment. Since 2000, the FDA has approved over 600 indications for cancer, all tested through clinical trials. This includes approvals of over 200 new treatments, with many products receiving approval for multiple treatment indications, such as for specific cancer types or patient age ranges.¹ Virtually all these advances rely, at least in part, on basic research conducted by NCI-supported scientists.

NCI is modernizing and streamlining clinical trial design by reducing complexity, broadening access, simplifying patient participation, and speeding up collection of results through innovative approaches, such as pragmatic trials, AI, and revised eligibility criteria. NCI is also working toward adopting standard data collection practices for specific late-stage clinical trials to address the increasing complexity and costs of cancer trials.² The NCI Virtual Clinical Trials Office pilot is developing best practices for accelerating testing of new approaches to prevention, diagnostics, treatment, and survivorship.

The estimated FY27 NCI budget would enable NCI to further modernize clinical studies and expand clinical research networks into local community oncology practices where most people receive their care. This can improve access to NCI-sponsored clinical studies and high-quality cancer care for all Americans.

Investments in Foundational Research Grants and Training

As the largest funder of cancer research in the world, NCI supports a broad portfolio of research—from cancer laboratory discoveries to clinical trials to population sciences. Investigator-initiated research is central to NCI's mission. NCI-funded, investigator-initiated basic research has produced transformative cancer research; examples include the field of immunotherapy³ and the association of the BRCA1 and BRCA2 genes with hereditary breast cancer.⁴ Importantly, foundational cancer research supported by NCI does not benefit just people with cancer – insights learned often foster medical advances for other diseases, meaning the investments benefit even more Americans.



NCI invests in pioneering research with the potential for major breakthroughs, pursuing bold ideas in cancer prevention, diagnosis, and treatment that may not receive private-sector funding because it is viewed as too risky. This approach has yielded transformative results for more than 80 years, as some of the most significant advances in cancer research have come from foundational research that carries a high degree of uncertainty, but has produced major breakthroughs for the American public.

NCI backs high-risk basic research, which industry usually avoids. To continue progress, the NCI FY27 budget estimate allows NCI to offer sustained support for research in an environment that promotes open review and scientific integrity. Today's investments in basic cancer research establish the foundational understanding of cancer development and progression that is necessary for tomorrow's breakthroughs.

Importantly, NCI has a long-standing commitment to train, develop, and support a strong workforce of researchers spanning the career continuum, who are prepared to take full advantage of the opportunities of today and tomorrow. This includes ensuring continued education and improving the skills of the current workforce, thinking holistically about career pathways, and developing approaches to maintain an innovative workforce over time. Sustained and consistent support of the next generation of cancer scientists is imperative – these are the people who will make the paradigm-shifting discoveries of the future and will help the U.S. maintain its position as a world leader in cancer research.

Cancer Prevention

Cancer prevention can save more lives over time than treatment alone and is a critical part of NCI's effort to reduce the burden of cancer in the United States and globally. Researchers estimate that behavior changes like tobacco use reduction, vaccination, and other proactive measures could prevent nearly half of all cancer deaths.⁵ Effective prevention reduces cancer incidence and morbidity, so fewer people face the physical, financial, social, and psychological harms of cancer diagnosis and treatment.

NCI supports research that examines how internal factors like genetics and external factors like environmental carcinogens contribute to cancer risk. This includes studies that target modifiable risk factors such as nutrition, physical activity, and tobacco use, which are critical to decreasing cancer incidence rates and improving the health of all Americans.

Because there are economic and scientific barriers to prevention research, it is rarely conducted in the private sector. This makes NCI's role essential. In addition to basic and translational prevention research, NCI supports cancer prevention clinical trials through programs such as the NCI Community Oncology Research Program. The return on NCI's investments in cancer prevention can be seen in the declining incidence and mortality of several types of cancer, most notably lung, colorectal, and cervical cancers,⁶ the latter of which has a highly effective preventative vaccine that was developed with foundational research from NCI scientists.⁷

By advancing proven and novel prevention strategies, NCI seeks to further reduce the number of Americans who face a cancer diagnosis and the associated personal and societal costs. The budget estimate would allow NCI to develop new cancer prevention methods and expand the use and accessibility of proven strategies.



Early Detection and Screening

A recent study estimated that more than 15,000 lives could be saved if only 10 percent more of the eligible U.S. population underwent lung, colorectal, breast, and cervical cancer screening tests as recommended.⁸ For many cancers, early detection offers the best chance for successful treatment and positive patient outcomes. NCI supports research on biomarkers, imaging technologies, and screening tools to identify cancers at their most treatable stage. This research, supported by the estimated budget, will bring new early detection and screening technologies into clinical care, broadening access and reducing the time between discovery and patient benefit.

NCI research also directly improves the standard of care, including improvements in cancer screening.

For example, an NCI-supported longitudinal screening trial⁹ focused on prostate, lung, colorectal, and ovarian cancers influenced multiple clinical practice guidelines. This included whether patients should undergo periodic prostate specific antigen screening for prostate cancer.¹⁰ Trends in SEER cancer registry data and NCI-supported modeling informed recent colon¹¹ and breast¹² cancer screening guidelines that recommend an earlier age for screening, which helps detect the disease sooner and allows for better treatment options and outcomes.

Advancements in screening, prevention, and treatments have allowed people to live longer, healthier lives after a cancer diagnosis and treatment. However, there is still more to be done, especially since there are no effective screening tools for many cancers. Multi-cancer detection (MCD) tests, like those being investigated in the NCI-supported Vanguard Study, have the potential to change how we screen for cancer and potentially improve outcomes by detecting cancer at its earliest stages, including cancer types without existing screening methods. More research is needed to determine whether MCDs reduce deaths and ensure that benefits outweigh harms.



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STORIES OF CANCER RESEARCH

NCI supports cancer research to advance scientific knowledge to better understand, prevent, detect, diagnose, and treat cancer and to help cancer survivors live longer, healthier lives. The Fiscal Year 2026 Annual Plan and Professional Judgment Budget shares the stories of Justin, who participated in an NCI clinical trial after his non-Hodgkin lymphoma persisted despite four different treatments; Leeya, an early-stage investigator who received a grant through NCI's Cancer Moonshot Scholars program to study cervical cancer prevention in low-resource settings; and CYTALUX, a molecule that makes tumors glow in the operating room.

- [Opting for a Novel Combination Treatment for Resistant Aggressive B-Cell Lymphoma](#)
- [Treating Precancer in Low-Resource Settings to Prevent Cervical Cancer](#)
- [Lighting the Way to Detect Tumors During Surgery](#)

Opting for a Novel Combination Treatment for Resistant Aggressive B-Cell Lymphoma

Justin, who lives in western Pennsylvania, is passionate about the outdoors. He works for the U.S. National Park Service, maintaining hiking and biking trails around the country, including in California's Shasta-Trinity National Forest and Yosemite National Park, Colorado's Rocky Mountain National Park, and parks in northern Minnesota. He also teaches chain saw classes for the National Park Service and loves to fish and hunt in his free time.

He was working on a stone wall in the New River Gorge National Park and Preserve in West Virginia when he suddenly felt pain in his groin. Thinking he had a hernia, Justin went to his primary care doctor and had imaging followed by a biopsy. The biopsy revealed that Justin had stage 4 follicular [non-Hodgkin lymphoma \(NHL\)](#). He underwent a standard 6-month chemotherapy regimen and had no evidence of disease at the end of the treatment.

A month later, however, doctors found a 13-cm growth at the base of his spine. The operation to remove the growth was complicated, and Justin became septic and almost died. Once he recovered, he had two more chemotherapy regimens. Each seemed promising for a short while, but then the cancer returned.

He then underwent [CAR T-cell therapy](#) at his doctor's suggestion. However, a month after that treatment ended, scans showed that Justin's follicular lymphoma had transformed into an aggressive diffuse large B-cell lymphoma (DLBCL)—a change that happens in a small percentage of people living with follicular lymphoma.

Faced with the disappointment that yet another treatment had not eliminated his cancer, Justin next considered a bone marrow transplant, which came with significant risks. His local oncologist instead recommended that he enter a new clinical trial at the National Institutes of Health (NIH). "I had some hesitation because of my experience with the earlier treatments," he recalled. "But if the bone marrow transplant failed, then I might have been too sick to enroll in the trial. I was out of options."

Benefiting from the innovative ViPOR treatment

Justin chose to enroll in the [NCI clinical trial testing a treatment called ViPOR](#) at the NIH Clinical Center in Bethesda, MD, in December 2020. ViPOR is a five-drug combination targeted therapy designed to interrupt multiple pathways that DLBCL cells use to survive, such as B-cell receptor signaling. And the new treatment does this without chemotherapy.

Dr. Christopher Melani, co-investigator and Justin's trial doctor, explained that previous laboratory studies conducted by intramural researchers at NCI revealed the potential of this combination of drugs—which includes venetoclax, ibrutinib, prednisone, obinutuzumab, and lenalidomide (Revlimid)—against NHL, including DLBCL.

Justin stayed at the NIH Clinical Center for an initial 2 weeks of treatment, then returned home for a week without treatment. He repeated 2 weeks of treatment followed by 1 week off for another five cycles, finishing in April 2021.



Justin benefited from a novel 5-drug treatment called ViPOR for non-Hodgkin lymphoma.

Credit: Sage Storm

Like many of the patients in the trial, Justin had fewer side effects on this protocol than his prior therapies—some fatigue and cramping due to low potassium levels. By the end of his first cycle of ViPOR, his tumors had shrunk by more than 90%. “The treatment was like a pain reliever,” Justin said.

One year after completing ViPOR treatment, Justin returned to his job at the National Park Service full time, and 3 years later his cancer has not returned. Dr. Melani describes him as likely cancer free. “Many of these patients whose cancers stopped responding to standard treatments would have otherwise died within a year, and now we have a good proportion who are still alive 2 years later, and some now 5 years later,” said Dr. Melani. “It’s gratifying to see these long-term remissions and potential cures in patients.”

Appreciating life without cancer

Justin has been cautious about celebrating too quickly. He waited until this past spring to have his infusion port removed. “The entire ordeal of having cancer, getting four separate treatments, and having my cancer return shortly after each treatment ended, has been stressful,” he shared. “I still get anxiety when I feel pain in my body.” He gets annual surveillance and is grateful that the screenings continue to show no cancer.

On social media, he participates in several cancer groups and encourages others with DLBCL to consider participating in the ViPOR trial. “I wouldn’t be here without NCI,” Justin effused. “The NIH Clinical Center is one of the country’s best kept secrets.”

Justin looks forward to attending his elder son’s high school graduation next year and spending more time with his younger son. He completed a bucket list item soon after he concluded the ViPOR protocol—visiting all 48 contiguous states, and he is planning additional trips. He and his wife want to travel with their sons and show them the coral reefs, as well as the redwood trees on the West Coast. Wherever Justin travels, you can bet he’ll be enjoying the outdoors.

Treating Precancer in Low-Resource Settings to Prevent Cervical Cancer

Leeya Pinder, M.D., M.P.H., of the University of Cincinnati, knows how to bridge divergent cultures—geographical, social, and professional—and thrive in them. She grew up in Queens, New York, for the first half of her childhood and then adapted to being a teenager in Charleston, South Carolina. At age 7, Leeya decided to become a doctor and let nothing stand in her way.

Encouraged by various teachers who made learning science fun, she majored in chemistry and pursued medicine at the Medical University of South Carolina. After working for 5 years as a gynecologist in a private practice, Leeya realized that she wanted to practice medicine differently, and she pivoted to global health and gynecologic oncology.

This decision led her to Kenya, where she witnessed the daily struggles of living in a place without access to adequate health care. She developed programs that integrated cervical cancer screening into HIV clinics. Reflecting on the gynecological services she provided, Leeya mused, “Being in Kenya was my first understanding of: ‘Live in the place in which you work, if you really want to affect change.’” Her time there motivated her to make a difference in medically underserved communities and solidified her focus on cervical cancer research. She saw the need for more effective, less invasive, and scalable interventions for cancer prevention and treatment in low-resource settings.

Leeya excelled in global health work and gained further insights from mentors and through several fellowships, conducting research in the United States and Zambia.

In 2023, she joined the University of Cincinnati as associate professor and director of the Center for Global Cancer Control, where she focuses on increasing cervical cancer prevention in Cincinnati and across sub-Saharan Africa. She also advocates for HPV self-testing in appropriate settings, both in the United States and abroad, and her work in Zambia informs her research in Cincinnati.

Cancer Moonshot Scholar R37 award

Bolstered by her work in Kenya and Zambia, Leeya submitted her first [R01 grant](#) application to NCI’s Cancer Moonshot Scholars program. The program is designed to diversify the cancer research workforce while advancing science. Applicants must be supported by their institution. She was thrilled to be selected for the inaugural Cancer Moonshot Scholars cohort and awarded the R01 grant in 2023. She was further elated that it was converted to an [R37 MERIT Award](#), which brings with it the possibility of an additional 2 years of funding. “This grant has changed a lot for me,” Leeya remarked. “It’s given me the freedom to be a scientist primarily, as well as the confidence that what I do actually matters.”

Reflecting on NCI’s support of early-stage investigators, particularly groups underrepresented in biomedical research, Leeya said: “This support gives us the opportunity to step into a space where we can actually make a difference and leverage our ideas. And to be in one of the first cohorts of this program—it’s an incredible opportunity.”

A recent White House Cancer Moonshot Scholars event provided such an opportunity, where people from different research disciplines met to discuss potential collaborations that could move science forward in



Leeya Pinder, M.D., M.P.H., is studying ways to prevent cervical cancer in low-resource areas.

Credit: Leeya Pinder

meaningful ways. At the event, Leeya connected with an engineer from MIT, and they discussed Leeya's work with cervical precancer and the vaginal microbiome.

"She is a device person, and I'm a science person," Leeya stated. "We're now partnering to make a difference in women's health. I think this kind of collaboration is what will be transformational in the future."

The POLESA trial

Leeya's R37 research on "Repurposed Antiretroviral Therapies to Eliminate Cervical Cancer" addresses a challenge of treating cervical precancer, particularly in low-resource settings. Her earlier work in Zambia showed that women living with HIV do not respond as well as women who do not have HIV to the three standard methods for treating cervical precancer: freezing, heating, or removing. However, in previously published research, she discovered that an older antiretroviral medicine may help.

As part of the work supported by her R37 grant, she is testing the antiretroviral medicine in combination with one of the three standard treatment options for cervical precancer in women living with or without HIV in Zambia. The clinical trial is called POLESA, which means "to heal" in the native Nyanja language.

"My goal is to try to heal the cervix so that this disease doesn't progress to cervical cancer," Leeya explained.

An important advantage of the medicine is that it is self-administered. "This is a treatment that women can do in the comfort of their own home without having an invasive procedure performed," she explained.

Enrollment in the trial was postponed by a delay in obtaining the study drug. Leeya was undeterred by the pause, and continued to study behavioral aspects, such as women's vaginal hygiene routines, which might affect the response to treatment. She uses surveys to gather behavioral information and devotes time to hear ideas and feedback from the community and local advisory boards: "Listening is essential for success in low-resource settings."

By gathering the behavioral surveys first, followed by examination of the vaginal microenvironment, Leeya is better able to tailor the treatment for each patient. And through this approach, she can learn what factors will affect the outcome in her effort to eliminate a patient's cervical precancer.

She looks forward to the day when multiple tools—such as artificial intelligence, immunotherapy, and vaccines—establish a universal, affordable solution to prevent and treat cancer. Until that happens, whether in Zambia, Cincinnati, or elsewhere, Leeya will continue to help address challenges in cervical cancer prevention in low-resource settings, one woman at a time.

Lighting the Way to Detect Tumors During Surgery

In 2010, a company called On Target Laboratories, based in West Lafayette, Indiana, was founded with the goal of helping doctors find cancers more easily during surgery. Their first product was CYTALUX (pafolacianine), a molecule that makes even the tiniest of tumors glow brightly in the operating room. Today, surgeons are finding tumors in lungs and ovaries more easily using this first-of-its kind tool. But the path to bring CYTALUX from the laboratory into the operating room took a lot of persistence from the small start-up company—a journey that was helped along with support from [NCI's Small Business Innovation Research \(SBIR\) program](#).

Seeing the need for innovation

Sumith Kularatne, Ph.D., vice president of research and development for On Target, was part of the original team that envisioned the potential of a tool like CYTALUX. Having lost his grandfather to cancer when he was a young boy in Sri Lanka, Sumith has spent much of his life blending his love of chemistry with a strong desire to help families affected by cancer. This led him to the United States, where he eventually began researching molecules that could help reveal cancer cells during surgery in real time.

“Surgeons are dealing with a challenging situation,” Sumith explained. Sometimes, a tumor is buried underneath the surface of an organ, rendering it invisible to the naked eye. At other times, a tumor may be too small or not solid enough for a surgeon to feel it with their fingers or surgical instruments. These pitfalls, he continued, inspired On Target to develop a technology that could enhance the surgeon’s sense of sight—like a pair of tumor-revealing glasses.

Advancing innovative research and technologies is the goal of NCI’s SBIR program, which funds researcher-initiated projects that align with NCI’s mission. Through the federal SBIR program, small businesses can receive funding, resources, and other support to help drive innovative technologies like CYTALUX into the marketplace to benefit patients.

Making tumors glow

CYTALUX is a modified version of folate, commonly known as vitamin B9, that is attached to a fluorescent dye. There are many more folate receptors on the surface of certain tumors than on surrounding cells in the body. This overabundance of folate receptors provides a target that researchers can use to shuttle cargo, such as the fluorescent dye in CYTALUX, to a tumor’s location.

Once CYTALUX binds to folate receptors and enters tumor cells, a special camera used during surgery causes the dye to emit a bright green signal. This approach, the team found, worked well in animal models of ovarian cancer, the cancer type with the largest concentration of folate receptors.

A logical next step was to test CYTALUX in lung cancer, which has a high proportion of folate receptors and causes more deaths in the United States than any other cancer. While surgery remains the gold standard for treating early-stage lung cancers, as many as a third to half of these cancers return, likely because some tumors or tumor cells remained behind after the initial surgery.



CYTALUX binds to a tumor in the lung and glows brightly.

Credit: On Target Laboratories

With limited funding options for the highly experimental work, the On Target team competed for and received a phase 1 SBIR grant to study CYTALUX for lung cancer in animal models. Two years later, with promising data in hand, the group received an additional phase 2 SBIR award to conduct more studies and scale up production of CYTALUX.

Others took notice of the company's success. On Target was selected to participate in [SBIR Investor Initiatives](#), an NCI-sponsored program that helps SBIR and Small Business Technology Transfer award recipients present their technology to investors and strategic partners.

Catalyzed by NCI's Investor Initiatives contacts, On Target received \$40 million in private financing. Those partnerships opened the door to more investors and eventually garnered the company enough support to launch clinical trials testing CYTALUX during surgeries to remove tumors in people with lung and ovarian cancers.

A shining return on investment

Surgeons were impressed. In those clinical trials, they saw the borders of tumors in real time, cutting out the cancer while preserving as much of the unaffected organ tissue as possible. They even removed cancers that they would have missed without CYTALUX because the tumors were not visible on scans.

In late 2021, the Food and Drug Administration (FDA) approved CYTALUX as an optical imaging agent for adults with ovarian cancer. Approval for adults with lung cancer followed a year later.

Almost 10 years after its first SBIR grant, On Target officially launched CYTALUX, making it commercially available in September 2023. It is now the first FDA-approved imaging agent to detect cancers in the lung and ovaries during surgery in real time.

"The [SBIR] grant helped us understand the full potential of what we have with CYTALUX," said Tim Biro, R.Ph., chief operating officer of On Target, who along with Sumith is one of the longest-serving members of the company. His gratitude for the chance to see the technology get developed and the company grow from three employees to more than 30 is evident. "SBIR support was really important to the company at that early stage."

If you ask Sumith about the importance of this work, he'd tell you that the return on investment is simple: "a better outcome for patients with cancer and their families."