

Trump Is Shutting Down the War on Cancer

America's cancer research system, which has helped save millions of lives,
is under threat in one of its most productive moments.

By Jonathan Mahler

Rachael Sirianni first learned her lab might be in trouble just a few weeks into the new year. A professor at the University of Massachusetts Chan Medical School, in Worcester, Sirianni focuses primarily on an aggressive form of pediatric brain cancer known as medulloblastoma. Researchers have made great strides in treating these tumors, but they are still often fatal, and even successful treatments can come with devastating side effects. Sirianni had spent the last several years working on a potentially transformative approach to treating the most malignant type of medulloblastoma and was making real progress.

Pediatric brain cancer research is expensive. UMass Chan pays for some of Sirianni's work, but most of her funding comes from the federal government. Entering 2025, she had three active grants at the National Institutes of Health that were all set to expire either this year or in 2026. She was prepared. In 2024, she submitted two new applications to continue her research. Both proposals had cleared the first hurdle at the N.I.H., earning strong scores from a panel of independent experts in the field. They were scheduled for another review at the agency in late January.

But then, in the days after Trump's inauguration, Sirianni started hearing rumors that he was planning to disrupt the N.I.H.'s grant-making process. As it turned out, he did much more than that. In late January, his administration or-

dered the N.I.H. to cancel meetings to consider pending grant applications.

Sirianni received her first federal research grant more than a decade earlier and had never even had an application-review meeting postponed. She scrambled to learn anything she could about the status of her proposals. This turned out to be difficult, because the new administration had ordered the N.I.H. to temporarily cease all external communications. Scientists were unsure whether they could even speak with program officers at the agency.

Sirianni, who is now 40, started college when she was 13. For more than two decades, she had spent as many as 12 hours a day in a lab, hunched over microscopes, computer monitors and lab mice. Now she was spending much of her time on the phone, talking and texting with equally anxious peers around the country. "Many of us had been in uncertain situations in the past — that's the nature of the game for academic scientists," she says. "But this was unlike anything we'd ever felt before."

Sirianni was lucky in that she had a modest buffer: When UMass Chan recruited her from the University of Texas in 2022, the school's chancellor, Michael Collins, gave her a generous start-up fund to get her new lab up and running and to pay her postdoc researchers, trainees and technicians. She had spent only half the money, so she could use what was left to help carry her and her staff through this period of uncertainty; she needed to keep the momentum going for her most promising studies and

pay the researchers overseeing them.

On March 11, though, Sirianni received a troubling email from UMass Chan's administration. The disruptions at the N.I.H. were creating so much uncertainty around the school's financial future that it had to indefinitely pause all discretionary spending and freeze all hiring. The money from Sirianni's start-up fund was now effectively frozen, and she had no choice but to shrink her lab. When a researcher and her lab manager left, she was unable to replace them. Nor could she offer positions to two undergraduates whom she had been mentoring and was planning to retain. More devastating still, she had to suspend one of her most promising pediatric brain cancer studies and eventually lay off the postdoc who was helping her run it.

There was a sliver of hope, though: The two grants that Sirianni applied for in 2024 were pending, and they were finally scheduled for their reviews at the N.I.H. in April and May. The delay had at least allowed her to add more compelling data to one application, strengthening her case for funding.

Both proposals received strong scores from the N.I.H. program directors who analyzed and discussed them. But as of the beginning of September, neither one had been funded. "I believe I am one of only a small handful of labs in the country that specializes in drug-delivery barriers in pediatric brain cancer," Sirianni told me when I visited her over the summer at her lab. "When you remove me from the ecosystem, you are removing something that can't be replaced."

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When America declared war on cancer more than 50 years ago, there was a misguided assumption outside the scientific community that it would be only a matter of years before the disease was eradicated — that defeating cancer would be no different than building an atomic bomb or putting a man on the moon. But there would be no miracle cure: As of this writing, some 40 percent of Americans will be diagnosed with cancer at some point in their life.

What there would be, however, was decades of minor breakthroughs that would accrue over time, transforming both our understanding of the disease and our ability to treat it. One way to measure the cumulative effect of those breakthroughs is with statistics: In the mid-1970s, America's five-year cancer-survival rate sat at 49 percent; today, it is 68 percent. You can also correlate America's sustained investment in cancer research directly with these returns: According to a recent study in *The Journal of Clinical Oncology*, every \$326 that our government spends researching cancer extends a human life by one year. Now an extraordinarily successful scientific research system — one that took decades to build, has saved millions of lives and generated billions of dollars in profits for American companies and investors — is being dismantled before our eyes.

In a matter of months, the Trump administration has canceled hundreds of millions of dollars in cancer-related research grants and contracts, arguing that they were part of politically driven D.E.I. initiatives, and suspended or delayed payments for hundreds of millions more. It is trying to sharply reduce the percentage of expenses that the government will cover for federally funded cancer-research labs. It has terminated hundreds of government employees who helped lead the country's cancer-research system and ensured that new discoveries reached clinicians, cancer patients and the American public. And the president's proposed budget for the next fiscal year calls for a more-than-37-percent cut to the National Cancer Institute — the N.I.H. agency that leads most of the nation's cancer research — reducing it to \$4.5 billion from \$7.2 billion. Adjusting for inflation, you have to go back more than 30 years to find a comparably sized federal cancer-research budget.

President Trump made a less ambitious attempt to defund America's scientific research system during his first term, proposing a 22-percent across-the-board cut to the N.I.H. in his inaugural budget and seeking to reduce institutions' reimbursement rates for some of their overhead expenses. Congress flatly rejected both efforts. To Republicans and Democrats, biomedical research — and cancer research, in particular — was sacrosanct.

But a very different attitude toward American science now prevails on the right wing of American politics. The Covid epidemic is largely responsible. Caught between a deadly pandemic and the government's oppressive countermeasures, many Americans sought someone to blame. A variety of vaccine skeptics, antigovernment MAGA types and wellness influencers and a discrete cohort of doctors and medical experts offered them a candidate: the scientific establishment. Their collective disaffection soon congealed into a powerful political force of its own, and a fringe movement to undermine the credibility of America's scientists went mainstream.

This force has become institutionalized in Trump's second administration. Defending the government's ongoing cuts to scientific research last May, Robert F. Kennedy Jr., a prominent vaccine skeptic who now leads the Department of Health and Human Services, told Congress that the N.I.H. was plagued by "corruption." Trump's N.I.H. director, Jay Bhattacharya, a co-author of the Great Barrington Declaration, a scientific treatise assailing America's Covid policies, made his name attacking the agency that he is now running.

Trump himself defended the cuts to biomedical research in a testy exchange with a *Time* magazine reporter last spring. "I could give you a list of abuse and waste and fraud," he said, "and you don't have any interest in hearing it." But neither he nor anyone inside his administration has spoken explicitly about its intention to radically rethink how America funds and directs cancer research, let alone laid out a plan for doing so.

In the absence of any such plan, it's hard not to see the ongoing dismantling of the cancer research system as collateral damage in a larger, partisan war against both the predominantly Demo-

cratic scientific establishment and the predominantly Democratic academic institutions where much of the country's biomedical research takes place. And yet the term "collateral damage" suggests a lack of agency; this has been a deliberate and targeted attack. "They have studied how N.I.H. works, studied it hard and learned it well," says Sarah Kobrin, head of the Health Systems and Interventions Research Branch at the National Cancer Institute. "And they have put sand in the gears in ways that are very effective, devastating." (The White House referred a detailed request for comment to the Office of Management and Budget, which said in a statement that the administration's "efforts to focus N.I.H. spending will establish a more sustainable and accountable fiscal path for N.I.H., while ensuring that resources are managed effectively and in a manner that best supports America's biomedical-research enterprise." An N.I.H. spokesperson said, "N.I.H. continues to invest significantly in bold and innovative cancer research.")

I spoke to 50 members of America's biomedical research establishment for this article — medical-school administrators; N.I.H.- and N.C.I.-funded researchers; former directors and current and former program officers and officials at the two agencies. As a group, they were hardly averse to change: Most acknowledged that the cancer-research system and the biomedical-research system more broadly had become too unwieldy and risk-averse. Before last year's election, both House and Senate Republicans circulated N.I.H. reform proposals on Capitol Hill, and the leaders of the National Institutes of Health and the National Cancer Institute were expecting — and even looking forward to — some new policies. "We didn't have our heads in the sand," says Michael Lauer, who retired in February as a deputy director of the N.I.H. and the agency's head of grant-making.

But no one was expecting this. "It's an absolutely unmitigated disaster," Lauer told me. "It will take decades to recover from this, if we ever do."

America's cancer-research system is sprawling and diffuse, beginning with Sirianni and the rest of America's tens of thousands of cancer researchers and

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continuing up through UMass Chan and the other research universities and cancer centers across the country that support their work. These institutions depend on the grant money their faculty members bring in to help cover their individual salaries and also to create and support their infrastructures — like the buildings that house the labs, the doctoral students and postdocs who help run them and the supplies they need to conduct experiments. This is the economic structure that built these institutions, and it's one that they have come to rely on to function.

UMass Chan is a short drive from some of the most prestigious cancer-research centers in the world. It may not have the reputation or resources of a Harvard or Dana-Farber, but it does have 234 principal investigators doing frontline, government-funded research. When Michael Collins took over as the school's full-time chancellor in 2008, one of his priorities was to expand its research program, and he has been unambiguously successful at doing so. On his watch, the school's annual research budget has nearly doubled, to \$352 million from \$157 million, some \$45 million of which goes toward cancer-related work. "If you have great scientists, you are going to win your share of grants," he says.

Last year was the high point of his 18-year tenure: He opened a new, \$350 million, 350,000-square-foot research building, and one of his scientists was part of a duo that won a Nobel Prize. This year has been a very different story. Collins has spent much of it in urgent meetings with his finance team trying to figure out how to deal with the reality that tens of millions of dollars were suddenly disappearing from his institution's anticipated revenues.

Collins suspected that trouble was coming even before the new administration took office in Washington. One of the most important federal funding mechanisms for UMass Chan and other research institutions is what's known as their indirect cost reimbursements. In short, the government covers a portion of their facilities and administrative costs. How much institutions are entitled to receive is known as their indirect-cost rate, a fixed number that corresponds to a percentage of the direct costs associated with specific research projects.

Every institution has its own indirect rate, negotiated with the government and determined by a variety of factors, like the cost of labor in its geographic region. UMass Chan has a high indirect rate — 67.5 percent — which means it is heavily dependent on these reimbursements. As Collins is quick to point out, though, the number is misleading. Because of certain caps and other limitations, the government reimburses the institution only for the indirect expenses associated with 44 percent of its direct costs. Those indirect expenses include the cost of administering the school's grants and the debt service on its research buildings.

During his first term, Trump tried to cap all indirect-cost reimbursements at 10 percent, which would have had dire consequences for UMass Chan. Congress not only rejected the effort but also added a rider to the budget bill preventing the administration from modifying indirect rates in the future. That same rider had been attached to every budget bill enacted since then.

Still, Project 2025 had called for the new administration to cut reimbursement rates, and Collins was worried that Trump would try again. A few days after the election, he flew down to Washington and met with Representative Lori Trahan, a Massachusetts congresswoman who sits on the committee that oversees the N.I.H., to remind her about the rider. Trahan was reassuring.

Collins's worries proved prescient. On a Friday evening in early February, the N.I.H. unilaterally amended its grant policy, ordering that all indirect-reimbursement rates be capped at 15 percent. Collins spent the weekend on the phone with his finance team, which calculated that the cut could cost UMass Chan somewhere between \$50 and \$60 million in expected revenues for the fiscal year. On Monday morning, Massachusetts and 21 other states sued the Trump administration to block the change. That afternoon, a federal judge in Boston issued a temporary restraining order halting the implementation of the new policy until its lawfulness had been adjudicated.

Collins was safe, but not for long. Soon after, he got a call from his finance team informing him that the federal grant payments for the week were not avail-

able. There was little explanation from the government. The money simply wasn't accessible. The way the federal grant-making process works, researchers apply for funding through their respective institutions and the money is then disbursed through those institutions. Collins relies on those funds to help pay the salaries of his professors. Now he would need to find the money elsewhere to make up the difference.

Weeks passed, and there was still no money from the N.I.H., nor any clear explanation for why it had disappeared. At the same time, Collins had numerous faculty members who, like Sirianni, had grant applications pending at the N.I.H. that were completely stalled.

Already down some \$30 million and with anticipated future revenues in jeopardy, Collins had to take some sort of action. In March, UMass Chan furloughed 200 employees and sent out the email to Sirianni and the rest of the school's faculty members freezing all discretionary spending. It also rescinded the offers to all 87 students whom it had admitted to its graduate school of biomedical science for the 2025-26 academic year. (The school would partly reverse this decision several weeks later, offering spots to 14 students for the current academic year and accepting the rest for the following one.)

Collins was not alone. Chancellors and medical-school deans at research institutions across the country had all had their government funding disrupted, and they were by now comparing notes during a weekly Thursday night Zoom meeting. UMass Chan had not been targeted by the Trump administration for political reasons, but other institutions had been. Harvard, Columbia, Northwestern, Cornell, Brown and the University of Pennsylvania were among those whose N.I.H. funding was cut off because the White House claimed that they had violated the civil rights of their Jewish students. Like UMass, these institutions had also received little or no warning.

In April, Collins finally got some good news: The N.I.H. had resumed meetings to discuss pending grant applications. He had his finance team run some more numbers, calculating how many proposals UMass Chan had before the agency that had already cleared the first round of N.I.H. review and had received what

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is considered a fundable score. They determined that the school could expect between \$30 million and \$40 million in new grant payments for the remainder of the fiscal year. As of the end of June, however, very few of these applications had been approved.

By that point, the N.I.H. had started resuming some payments for existing grants to UMass Chan, but the flow of money was still just a trickle — no more than a few hundred thousand dollars a week. By the middle of July, Collins was facing a research-budget shortfall for the fiscal year of \$93 million. Collins told me that he planned to take stock again at the end of September, at the close of the federal government's fiscal year, and decide what additional cuts he needs to make. In the meantime, he's doing everything he can to raise money from individuals, private foundations and the state of Massachusetts. "I'm trying to get people to be worried about this," he says, "and it's hard. We could lose a generation of scientists in a very short time."

The broad framework for America's cancer-research system can be traced back many decades, to the waning days of World War II. The scientific community had played a critical role in the war effort, and President Franklin Delano Roosevelt commissioned the head of his wartime Office of Scientific Research and Development, a former M.I.T. scientist named Vannevar Bush, to draft a report — "Science: The Endless Frontier" — that would argue for carrying the partnership between government and academia into peacetime. Bush made the case that basic scientific research was critical to maintaining America's global leadership role and economic vitality, and he argued that this research should be funded by the federal government and carried out by universities.

It would be many years, though, before the government would make a large and sustained investment in fighting cancer. The individual most responsible for prodding the government into action was not a politician but a New York philanthropist and socialite, Mary Lasker. Lasker started lobbying for a sweeping government-funded effort to fight cancer in 1952, after her husband died of colon cancer, and pretty much never stopped. In

1969, she turned her lobbying campaign into a public crusade that included a series of full-page newspaper ads challenging President Richard Nixon to invest the same sort of resources and energy into fighting cancer that the government had put into the Apollo space program. Two years later, Nixon signed the National Cancer Act into law, committing \$1.5 billion — about \$12 billion in today's dollars — over the next three years to fighting cancer. Thus began the War on Cancer, the most ambitious public-health initiative ever undertaken.

Before scientists could begin to figure out how to defeat cancer, they first had to learn how little they knew about its biology, starting with the fact that it was not a single disease but an infinite number of them, with hundreds of subtypes that don't just originate in different parts of the body but also behave differently in different people. The process took decades and is ongoing. Not until the late 1990s did all of the accumulated knowledge about the molecular biology of cancers begin to yield transformative treatments, in the form of targeted therapies designed to attack specific types of cancer. Since then, progress has accelerated. Between 1991 and 2022, the death rate from cancer in the United States fell by 34 percent; 4.5 million fewer people died of cancer than otherwise would have.

As scientists' understanding of the disease deepened and new paths to treat it proliferated, the cancer-research system expanded. It now reaches into just about every medical specialty, subspecialty and scientific discipline. It is diffuse but also interconnected, with researchers sharing their findings in peer-reviewed medical journals and at scientific conferences. Cancer research seldom has a clear, monetizable endpoint — it is often work, in other words, that private industry would never support. The system's extraordinary success is most clearly observed in retrospect, by looking at cancers that were fatal just a couple of decades ago and that doctors can effectively treat today. This progress is a validation of a slow but patient process that requires time — and the gradual accretion of shared knowledge — to prove its value.

America's investment in cancer research has rippled out far beyond can-

cer. Investigating the molecular biology of one disease can naturally lead to discoveries about other ones — a phenomenon that scientists call convergence. It was cancer research that led to the creation of treatments for H.I.V. and hepatitis C, and to a vaccine for hepatitis B. When the Covid pandemic struck, technologies that had been developed for cancer enabled scientists to quickly sequence the virus and then develop a vaccine for it. The Cancer Genome Atlas, which collected and analyzed DNA samples from 11,000 cancer patients over 12 years, didn't just become a model for the mapping of other diseases; it also accelerated the evolution of the emerging interdisciplinary field of data science. America's prodigious investment in cancer research also helped jump-start the biotechnology industry, a powerful engine of medical innovation in its own right.

Sirianni's story speaks to both the short- and long-term benefits of America's cancer-research system. Her work builds on that of other drug-delivery scientists and is both costly and labor-intensive. Pediatric cancer cells can't easily be grown in vitro in a lab; they are typically harvested from operating rooms and then cultivated in lab animals — most commonly, an expensive strain of mouse. Pediatric brain cancer is also a highly specialized field, so it can take a while to train doctoral students and postdocs to become comfortable in the lab. Sirianni is targeting a specific subset of a relatively rare cancer; about 300 or so children are diagnosed with medulloblastoma every year. It is the kind of work that is unlikely to attract private investment at this early stage. And yet if she succeeds in developing a more effective method of moving therapeutic molecules into the interior of the brain to attack this particular form of cancer, she might not only save or improve the lives of many children; the technique could very well transform how doctors treat other neurodegenerative diseases like A.L.S., Alzheimer's and traumatic brain injury.

Government-funded cancer researchers across the country are engaged in work with similarly groundbreaking potential. At Ohio State University, investigators are experimenting with a so-called flash-radiation treatment that

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lasts just a few tenths of a second, killing cancer cells and causing significantly less harm to the surrounding healthy tissue. At Stanford, scientists are using machine learning and mathematical modeling to more accurately predict the evolution and outcome of tumors. At Johns Hopkins, researchers recently discovered a way to detect cancer-derived mutations in the bloodstream up to three years before clinical signs or symptoms — advancing progress toward the development of a routine blood test that will be able to screen for a range of cancers. At the University of Washington and elsewhere, researchers are developing cancer vaccines. (Some, however, are mRNA vaccines, which could be threatened by Robert F. Kennedy Jr., who has already halted funding for the development of mRNA vaccines for infectious diseases.) “This is one of the most productive periods in the history of cancer research,” Norman Sharpless, who served as the director of the National Cancer Institute during the first Trump administration and for part of Biden’s presidency, told me. “At the same time, my colleagues are experiencing something between malaise and terror.”

As might be expected of any complex, multibillion-dollar entity that has been growing and evolving over decades, America’s cancer-research system has developed structural problems that need to be addressed. Because there is no mandatory retirement age for academics, the research field has aged sharply; between 1980 and 2008, the average age for an N.I.H.-funded principal investigator rose from 39 to 51, and it has slightly increased since. This has crowded out a lot of younger scientists with fresh ideas. It has also made the grant-application process enormously competitive, which means principal investigators have to spend a disproportionate amount of their time not doing research but writing grant applications. To secure funding in such a cutthroat environment, investigators are often inclined to propose safer, more incremental projects, rather than more cutting-edge ones. The top-heaviness of the research field and the time-consuming nature of the grant process is holding back progress and making it difficult to attract the most talented American students, which explains why so many

postdoctoral researchers in American labs are from other countries, principally China and India.

It’s perhaps no surprise that the Trump administration’s attack on America’s biomedical research system has been embraced by the disruption-addicted tech right. A government-run research system of sustained investment, collaboration and incremental progress no doubt looks anachronistic to a culture of individual visions, competitive silos and overnight growth — and all the more so with the leaders of various generative-A.I. companies making far-fetched promises to cure cancer in a matter of years.

Last May, in the early months of the Trump administration’s cuts, the venture capitalist and Palantir co-founder Joe Lonsdale took aim at America’s biomedical-research establishment in a Substack post titled “Fix the N.I.H. to Fix American Science.” Lonsdale bemoaned the lack of breakthroughs to treat many cancers and proposed some of his own solutions. In addition to a sweeping regime of cuts to “underperforming labs and scientists” that “fuel mediocrity” and advance political agendas, Lonsdale called for a new federal grant-making process that would reward risk-taking and embolden visionaries. “In too many ways, the N.I.H. embodies the Soviet model that should have been left to die in the 20th century,” he wrote. “Centralization, top-down ideological control of processes and an extreme conviction by the bureaucrats that they know better than anyone about everything.”

Dismantling a structure as large and multifaceted as America’s cancer-research system is much easier than building one, but it is not without its challenges. The system was designed to be insulated from politics. Traditionally, there were only two political appointees at the N.I.H.: its director and the director of the National Cancer Institute. What’s more, it’s not the executive branch but Congress — which has a long history of bipartisan support for cancer research — that allocates the grant money that funds the scientists and their institutions. Tearing down the system, then, would require moving quickly and aggressively, taking control of it from the top down, clearing out civ-

il servants and scientists while choking off the flow of money to universities and research centers.

The administration was much better prepared to accomplish this during Trump’s second term than during his first. Russell Vought, the director of the White House’s Office of Management and Budget and the primary architect of the attack on the biomedical-research system, spent the Biden years getting ready for this moment, drawing up a detailed plan to markedly shrink the federal government and end what he has called “the woke and weaponized bureaucracy.”

He and the new administration began executing their plan on Trump’s first full day in office. The first step was to effectively paralyze the N.I.H. and N.C.I. by ordering them to pause all external communications. They accomplished this via the sweeping communications ban issued by the acting head of H.H.S., Dorothy Fink. The directive compromised the agencies’ ability to interact with the scientific community. But it also stopped the publication of all scientific research and, crucially, of any information in *The Federal Register*, in which all new opportunities for funding and all meetings to consider new grant applications have to be listed. As long as the communications pause was in effect — and the order wasn’t clear about when it would end — there would be no new opportunities for cancer researchers, and all pending proposals, like Sirianni’s two applications at the N.I.H., would be indefinitely delayed.

More directives followed in the days ahead, first a suspension of travel for N.I.H. employees and then a memo from the White House’s Office of Management and Budget freezing grant funding from all federal agencies. Now, in addition to the ongoing pause on new cancer-research grant applications, no existing grants could be paid. All of this was unprecedented. Given the nature of the N.I.H.’s work — supporting biomedical research — new administrations usually went out of their way to make sure that transitions were as seamless as possible. “I don’t ever recall a gag order or a grant freeze in my time at N.I.H.,” says Lauer, the former N.I.H. deputy director who spent 18 years at the agency.

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A group of nonprofits sued the administration over the funding freeze and were granted a stay in late January, ensuring that grant money would continue to flow while the case was briefed. In response, the administration withdrew the memo announcing the freeze — seemingly lifting it, per the court's order. But then the new White House press secretary, Karoline Leavitt, announced on her social media account that the order was still in effect. No one at the N.I.H. was sure what to do. At N.C.I., the confusion was especially acute. The agency's director, Kimryn Rathmell, resigned the day of Trump's inauguration, and the president had not named an acting director to replace her, instead consolidating power at H.H.S.

The first round of layoffs came soon after, in mid-February. Some 1,200 N.I.H. employees were terminated, including 140 or so people at N.C.I. — senior leaders, scientists, grant administrators and many others. The O.M.B. order to freeze all grant payments had already disrupted the flow of money to research universities and centers. But in March, H.H.S. started formally canceling hundreds of active research grants.

This, too, was virtually unprecedented; Lauer recalled a total of two grants being unilaterally terminated by the government over the course of his career at the N.I.H. Now numerous grants that didn't comport with the administration's priorities, specifically as they concerned its D.E.I. policies, were being flagged for cancellation. At N.C.I., Sarah Kobrin, who focuses on cancer prevention, found herself trying to defend government-funded projects dedicated to increasing cancer screening in rural communities that happened to have large Black populations.

There was a more efficient way to stop the flow of money than terminating individual grants. Later in the winter, the Trump administration simply took control of the grant-payment system at H.H.S. — via Elon Musk's Department of Government Efficiency — and began freezing billions of dollars in N.I.H. funding for a group of universities that appeared on a target list compiled by the administration's new task force to combat antisemitism.

More layoffs followed in the spring. Pretty much the N.C.I.'s entire 70-person

communications department, which was responsible for keeping the public and the medical and scientific communities abreast of the latest developments in the world of cancer research, was let go and not replaced. So was the N.C.I.'s acquisitions department, which purchased all the agency's office and lab supplies and issued all its contracts. A chief surgeon at the National Cancer Institute, Steven Rosenberg, who is leading a clinical trial testing the use of immunotherapy on acutely ill patients with gastrointestinal cancer, lost two of the scientists in his lab who produced the cells with which he injected his patients.

Another way to cancel grants in bulk was to go after grant programs. The new administration terminated one of the N.C.I.'s most prestigious ones, the Outstanding Investigator Award, a seven-year grant intended to give cancer researchers with a track record of success the freedom to explore more innovative approaches in their field. It also ordered the N.I.H. to overhaul its approach to funding grants that weren't being canceled. The administration wanted half of all remaining funding for the fiscal year to be "forward-funded" — or paid out in full upfront. This would consume a large portion of the N.C.I.'s budget for the year, and translate into a significant cut to the number of new cancer-research grants that could be approved and funded. The National Cancer Institute recently informed the scientific community that it expected to be funding just 4 percent of all grant applications for the remainder of the government's fiscal year — less than half of last year's already-low 9 percent. In July, a public-policy professor at the University of Michigan, Donald Moynihan, posted an anonymous note on his Substack from an N.I.H. expert who described the abrupt shift to forward-funding as "a nuclear bomb dropped on cancer funding."

How was any of this even possible? The American people, through their representatives in Congress, had already allocated this money for research. When a president withholds congressionally appropriated funding, it is called impoundment, which Congress placed strict limits on in 1974. But Vought has insisted that the president is within his rights to refuse to disperse these funds. And he has argued that any money that

hasn't been spent by the end of the fiscal year should be returned to the Treasury — a move known as a pocket rescission, which is considered illegal by the Government Accountability Office and other legal experts.

Whether the new administration's actions are legal or not, it has succeeded in blocking the disbursement of a lot of congressionally appropriated funds. Between Jan. 20 and Aug. 20, the N.I.H. paid out \$4.31 billion less in grants than it did during the same period last year. The N.C.I., for its part, paid out \$842 million less. And these numbers don't account for the many other billions of dollars in grants and funding that have been terminated or frozen since Trump took office.

Of course, withholding all of this money required a whole new structure inside the government. The N.I.H. no longer has two political appointees; it now has more than 20. The administration didn't so much tear down a top-down, ideologically controlled bureaucracy as it created a new one.

In the summer of 2008, my mother, who was 70 years old at the time, lost her appetite. She was a petite woman to begin with, but over the course of the next few months she lost at least 15 pounds. For a while, she refused to go to the doctor — she was also stubborn — but when she finally did, she was diagnosed with small-cell lung cancer that had spread to her liver. My mom was a lifelong smoker, so the diagnosis was devastating but not surprising. It was too late for radiation or surgery. The only option was a highly toxic course of chemotherapy. She survived for nearly a year, but her quality of life was terrible; her weekly chemo treatments left her nauseous and exhausted, unable to get out of bed or eat solid food for days. She was fully lucid and mentally sharp right up until 24 hours or so before she died, when the morphine pulled her into a state of semiconsciousness.

Last year, when I was suffering from a lingering respiratory infection, I went to see the pulmonologist who treated her, Daniel Libby. We talked a little bit about my mom, and he mentioned to me, almost as an aside, that if she were diagnosed today, he would be able to do a lot more for her. Over the summer, I gave him a call. Now that I was working

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on a story about cancer research, I was curious to hear more.

Libby told me that if he were to diagnose my mom with cancer today, her initial biopsy would include an oncogene test to see which one of the 75 known lung-cancer genes he was dealing with and what mutation could be occurring. Depending on the mutation, there might be a drug that would be effective in slowing the growth of the cancer cells. Even if there weren't, the test would provide him with actionable information about how to best treat her. Rather than chemo, he would use immunotherapy to help her immune system recognize the cancer cells and fight them off, which would probably be both more effective and much easier on her body. It's impossible to know how she would have responded to the treatment, but he estimated that she might have lived an extra six months or even a year; maybe more important, her quality of life during treatment would have been vastly better than it was during her chemo.

It's too early to predict what the ongoing dismantling of America's cancer-research system is going to cost us — what lifesaving, life-extending or life-improving treatments will be slower to develop, if they develop at all. The White House's proposed budget, with its 37-percent cut to the N.C.I., is still awaiting congressional debate, and various court battles are still playing out. In June, a Reagan-appointed federal judge in Boston, William

G. Young, reversed some of the Trump administration's grant terminations in a stinging decision, writing that in his 40 years on the bench, he had "never seen government racial discrimination like this." But the administration appealed, and in late August, a 5-to-4 majority of Supreme Court justices upheld the cancellations, while leaving the door open for individual grantees to bring their own challenges.

The researchers, meanwhile, are doing what they can to continue their work. At UMass Chan, the top student in the biomedical sciences Ph.D. programs — the winner of the school's Chancellor's Award — has made plans to return home to China to run his own lab at Peking University. And Sirianni is now spending much of her time in her small office across the hall from her lab, furiously writing grant applications. For the time being, she is shifting her primary focus away from medulloblastoma, and toward other fields like traumatic brain injury. The experiments are too expensive to run, and she now has fewer researchers with the necessary expertise to help her. And pediatric cancer had very low funding rates at the N.I.H. before the Trump administration's cuts. Even if one of her new applications on a different project finds traction inside the N.I.H., though, it could take at least a year from the time of submission for the money to begin to flow. And these are just two scientists at a single institution.

Joe Lonsdale's blueprint for overhauling the N.I.H. promised a "moon-shot factory that unleashes a new era of discovery." But almost eight months into Trump's second term, we have seen no proposals to replace what his administration is tearing down. The cancer-research system may be big and sprawling, but its wholesale dependence on government funding also makes it almost uniquely precarious. It doesn't take much to disrupt its normal functioning, and in the realm of science, any sort of disruption can be devastating. "Running a lab is not like running a clothing store, where if your sales are down you can bounce back," Harold Varmus, a former N.I.H. director and Nobel Prize-winning cancer researcher, told me. "You are dealing with highly trained people and projects which, when stopped for a short time, are ruined."

Other countries are seeing opportunity in the chaos. Varmus is among a number of prominent U.S. scientists who have received solicitations from the governments of France and Spain to consider relocating there. America's 80-year run as the world's leader of biomedical research — and 50-year run as the global leader of cancer research — may very well be coming to a close, and for no apparent reason. Varmus seemed as puzzled as anyone by the development. "We are great in science," he said. "Why would we want to destroy one of our greatest assets?"