How Jimmy Carter boosted a life-saving cancer drug

Almost eight years ago, a dire health threat to the former president put the spotlight on a pathbreaking immune therapy

By Laurie McGinley
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When Norman C. Sharpless, a former director of the National Cancer Institute, talked to members of Congress about exciting new developments in immune therapy, "their eyes would immediately roll around to the back of their heads," he recalled.

But when Sharpless described the treatments as "'that drug that Jimmy Carter took,' boom, they knew exactly what I was talking about," he said.

In December 2015, news that Carter, then 91, had recovered from advanced melanoma — previously a death sentence — riveted the nation. Instantly, he became the face of a pathbreaking approach to battling cancer, which kills more than 600,000 people a year in the United States. Here was a beloved figure, apparently cured of a deadly disease by a medication that had harnessed Carter's own immune system.

"For the public, Carter put immunotherapy on the map, period," said Drew M. Pardoll, the director of the Bloomberg-Kimmel Institute for Cancer Immunotherapy at Johns Hopkins. "Patients started asking for it." It was called "the Jimmy Carter effect."

Even some oncologists were surprised by Carter's stunning recovery. "It was like, 'Holy smoke, this stuff actually works,'" Sharpless said.

Carter was given a diagnosis in August 2015 of metastatic melanoma — skin cancer that had spread to his liver and brain; he said later he assumed he had just weeks to live. But along with radiation therapy, he received a new intravenous drug called a "checkpoint inhibitor." Such drugs target proteins — checkpoints — that keep the immune system under control but also can blunt the body's cancer-fighting response.

The result put the spotlight on cancer drugs that do not target cancer directly but instead unleash the immune system to attack malignancies. In Carter, all signs of cancer were gone by the end of 2015, and his treatments were stopped soon after.

Carter, now 98, recently entered hospice care, which is designed to make patients comfortable at the end of life while eschewing efforts to cure illness. He did not provide details about his medical condition or say whether his cancer had returned. But several immunotherapy experts said it was unlikely that the disease had come back, considering that he was cancer-free for several years.

"The probabilities are low that this was a recurrence," Pardoll said. In recent years, the former president experienced other health setbacks, including several falls.

Carter's 2015 recovery from a deadly cancer electrified the public and the oncology world, helping to drive a reprioritization of government grants and pharmaceutical research. Today, checkpoint inhibitors are approved for more than 20 malignancies, including cancers of the kidney, head and neck, and some lung cancers, frequently in combination with chemotherapy and other medications. The percentage of patients eligible for the therapy, first approved in 2011, had risen to about 38 percent by 2019, according to an estimate published in the journal JAMA Network Open. About 1.9 million cancer cases will be diagnosed this year.

Government and private insurers typically cover the medications, whose list prices often are well above $100,000 a year. Patients' out-of-pocket costs vary according to their health plans.

Although oncologists say immunotherapy has transformed cancer care, curing some patients and extending the lives of many others, they agree that it is far from being a silver bullet. The response rates of patients vary widely — from about 10 percent to 60 percent — depending on their type of cancer and whether the drug is combined with other treatments, according to studies.

"Many of us hoped it would work better," Sharpless said. "Nobody is throwing in the towel, but it has turned out to be more difficult than we thought."

Hussein A. Tawbi, a melanoma expert at the MD Anderson Cancer Center in Houston, agreed that scientists are making great progress with immune therapies, but he cautioned that "we still leave a lot of patients behind."

Because of that, researchers are intensifying their focus on why immunotherapy works in some patients — and against some tumors — but not others. Tawbi is focusing on how immunotherapy can be used to treat cancers that have spread to the brain. About 30 percent of cancer patients develop brain growths, which can cause speech difficulties and headaches.

The idea of using the immune system to combat cancer has been around for decades. More than a century ago, the New York surgeon William Coley, now known as the father of cancer immunotherapy, treated patients with dead bacteria to spur the immune system to attack cancer cells.

In subsequent years, scientists explored immunotherapy, but the resulting drugs were largely ineffective and highly toxic; the field was largely seen as a backwater. That changed in 2011, when the Food and Drug Administration approved the first checkpoint inhibitor, called ipilimumab, or Yervoy. The drug blocks CTLA-4, a protein on immune cells that cripples their ability to attack cancer.

The medication was based on the discoveries of the MD Anderson scientist James P. Allison, who received the Nobel Prize in 2018 along with the Japanese cancer researcher Tasuku Honjo. The two won the award for studies leading to groundbreaking drugs that empower the immune system to fight cancer.

The drug given to Carter in 2015, at the Winship Cancer Institute of Emory University, is called pembrolizumab, or Keytruda. It was approved in 2014. The Merck medication, which has become a blockbuster in oncology, blocks a checkpoint called PD-1 and is used to treat many types of cancers.

In recent years, immune therapies have proliferated, becoming the fourth pillar of cancer treatment, alongside surgery, radiation and chemotherapy. In addition to the checkpoint inhibitors, a treatment called CAR T-cell therapy that was approved in 2017 sometimes is used for blood cancers such as leukemia and lymphoma. A patient's immune cells are removed, re-engineered in a lab to destroy cancer and reinfused into the body.

The checkpoint drugs have had their biggest effect in advanced melanoma. "It has been paradigm-changing," said Cary P. Gross, a professor of medicine at the Yale School of Medicine. Before the medications were developed, patients typically survived a matter of months. Now, the five-year survival rate is about 50 percent.

But the drugs are not a miracle cure. About half of patients with later-stage melanoma do not respond. And the treatments generally have not proved effective in deadly malignancies such as pancreatic cancer and glioblastoma, which affects the brain. Their record is mixed against lung cancer, the leading killer among cancers in the United States.

Gross thinks that "we may have to tone down our expectations" about immune therapies but that they will improve in coming years.

However, the drugs evolve, Carter, a longtime Sunday school teacher, has taught the public important lessons about new treatments and the hope they can provide, Gross said. More recently, he added, Carter has underscored the value of hospice by making public his decision about end-of-life care.

By sparking discussion on these critical issues, Gross said, Carter "has taught us so much," including how he wants to spend his final days.