

Q&A: 5 advances in cancer treatment

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QUESTION: In the past year, several family members have been diagnosed with various types of cancer, including leukemia, melanoma, breast cancer and colon cancer. In talking about treatments, it seems as if there is more available today than in the past. Can you share some of the advances in cancer care? What should I know as far as my risk for

cancer?

ANSWER: Although the rate of [cancer](#) diagnosis has fallen slightly post-COVID-19, cancer remains a common diagnosis in the U.S., affecting almost 2 million people annually. According to the Centers for Disease Control and Prevention, cancer remains the leading cause of death in the U.S.

The chronic nature of cancer is one of the reasons why there is so much research happening with countless organizations, including Mayo Clinic, which is always identifying and evaluating new treatment options to improve outcomes and reduce the burden of cancer for patients and their families.

Advancements in [cancer therapy](#) are increasing survival rates and offering hope for a cure to more people. We are now treating cancer more precisely and with fewer side effects. Here are five innovative cancer treatments that are changing the landscape of cancer.

CAR-T cell therapy

Chimeric antigen receptor-T cell [therapy](#) (CAR-T) is a relatively new therapy that was first approved in 2017 for the treatment of certain types of lymphoma, leukemia and multiple myeloma. Mayo Clinic was one of the centers that treated people as part of the clinical trial that led to the approval of this treatment.

CAR-T cell therapy uses the power of your immune system to fight your cancer. It involves modifying your [immune cells](#) and training them to attack the cancer [cells](#) in your body. CAR-T cell therapy is used to treat various conditions including specific types of lymphomas and leukemias, as well as multiple myeloma. With CAR-T cell therapy, about 70% to 80% of people with lymphoma experience remission, meaning their

symptoms of cancer are reduced or gone. More studies are underway using CAR-T cell therapies with more diseases and fewer side effects.

Immune checkpoint inhibitors

These therapies enhance your immune system's ability to detect and eliminate cancer cells. The inhibitors stop your body's natural checkpoints from limiting the body's immune response to cancer cells. The first checkpoint inhibitor was approved by the Food and Drug Administration in 2011 to treat melanoma. Since then, 15 more [immune checkpoint inhibitors](#) have been approved to treat over a dozen cancers, including small-cell lung, liver and colorectal cancers.

Minimally invasive surgery

For many people, surgery remains a necessary part of their cancer treatment. Minimally [invasive surgery](#) is defined as the use of small incisions and specialized instruments to remove cancer tissue. Since the incisions are smaller than in traditional procedures, minimally invasive surgery is associated with less pain, fewer complications and faster recovery times.

In recent years, minimally invasive surgical techniques have evolved further, and some surgeons are even using robotic technology to work more accurately and safely in the body's smallest spaces. Robotic surgery techniques are available for more diseases than ever before.

Personalized cancer vaccines

Similar to vaccines for childhood diseases and other illnesses, cancer vaccines have the potential not only to treat certain cancers but to prevent its recurrence. Several cancer vaccines already are approved to

treat melanoma, [bladder cancer](#) and [prostate cancer](#), but researchers are incredibly excited about personalized mRNA cancer vaccines. These vaccines would be custom-made for an individual based on the specific genetic features of their tumor. Personalized mRNA cancer vaccines are expected to be accessible within this decade.

Researchers are learning more about how these methods work by studying vaccines, as they can be used to treat cancer and prevent its recurrence. This understanding is paving the way for the potential to vaccinate preventively against some cancers, just as we do with many viral illnesses.

Advances in radiation therapies

For patients with certain types of cancers, radiation therapy often is prescribed as a part of treatment. Many people are familiar with proton beam therapy, which is a highly precise radiation treatment that destroys cancer cells while sparing surrounding healthy tissue. Proton therapy has been found to cause fewer side effects. Though this technology was approved decades ago, refinements continue to improve its usefulness in many tumor types.

The next advancement in radiation therapy is something known as carbon ion therapy. Like proton beam therapy—with its ability to precisely target and destroy [cancer cells](#) while sparing healthy tissue—carbon ion therapy is currently used to treat cancers that may be resistant to proton therapy. It is only available at a handful of medical centers in Europe and Asia. Mayo Clinic is building the first carbon ion therapy facility in North America at its campus in Jacksonville, Florida.

Innovations in cancer therapies are improving health outcomes and curing more cancers. Given the cancer diagnoses in your family, it is important to stay up to date on new innovations and therapies. Seeking

out information and resources from a comprehensive cancer center will be valuable as you and your family navigate the treatment and survivorship journey.

Your relationship with the [family members](#) already diagnosed with cancer will need to be reviewed to help determine your risk for certain cancers. Consider connecting with a genetic counselor who may be able to guide you regarding risk and appropriate screenings.

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