CANCER FACTS

National Cancer Institute • National Institutes of Health
Department of Health and Human Services

Cancer: Questions and Answers

Key Points

- Although cancer is the second leading cause of death in the United States, the survival rate for many types of cancer has improved in recent years (see page 1).
- Cancer occurs when cells do not stop growing (dividing) and do not die when they should. Cancer cells can spread (metastasize) to distant parts of the body through the bloodstream or lymphatic system (see Question 1).
- Cancer is the result of changes in the genes that control normal cell growth and death. These changes may be inherited, or may result from lifestyle factors (see Question 2).
- People can reduce their risk of cancer by adopting a healthy lifestyle. Screening exams can detect some precancerous conditions. In addition, people who notice certain signs and symptoms that may suggest cancer should see a doctor (see Question 3).
- Cancer can be treated with surgery, radiation therapy, chemotherapy, hormones, and/or substances that improve the immune system's ability to fight cancer (see Question 5).
- Clinical trials (research studies with people) are a treatment option for cancer patients (see Question 6).

About 1 million new cases of cancer will be diagnosed in the United States in 2003, and about half a million people will die of the disease. Cancer is the second leading cause of death in this country. However, improvements in cancer detection, diagnosis, and treatment have increased the survival rate for many types of cancer. About 60 percent of all people diagnosed with cancer will be alive 5 years after treatment.

1. What is cancer?

Cancer is a group of many related diseases that begin in cells, the body's basic building blocks. To understand cancer, it is helpful to know what happens when normal cells become cancerous.

The body is made up of many types of cells. Normally, cells grow and divide to produce more cells as they are needed to keep the body healthy. Sometimes, this orderly process goes wrong. New cells form when the body does not need them, and old cells do not die when they should. The extra cells form a mass of tissue called a growth or tumor. Not all tumors are cancerous; tumors can be benign or malignant.

Benign tumors are not cancer. They can often be removed and, in most cases, they do not come back. Cells in benign tumors do not spread to other parts of the body. Most important, benign tumors are rarely a threat to life.

Malignant tumors are cancer. Cells in malignant tumors are abnormal and divide without control or order. Cancer cells invade and destroy the tissue around them. Cancer cells can also break away from a malignant tumor and enter the bloodstream or lymphatic system.

Blood vessels include a network of arteries, capillaries, and veins through which the blood circulates in the body. The lymphatic system carries lymph and white blood cells to all the tissues of the body. By moving through the bloodstream or lymphatic system, cancer can spread from the original (primary) cancer site to form new tumors in other organs. The spread of cancer is called metastasis.

2. What causes cancer?

Scientists have learned that cancer is caused by changes (called alterations) in genes that control normal cell growth and cell death. Certain lifestyle and environmental factors can change some normal genes into genes that allow the growth of cancer. Many genetic changes that lead to cancer are the result of tobacco use, diet, exposure to ultraviolet (UV) radiation from the sun, or exposure to carcinogens (cancer-causing substances) in the workplace and in the environment. Some gene alterations are inherited. However, having an inherited gene alteration does not mean that the person is certain to develop cancer; it means that the chance of getting cancer is increased. Scientists continue to examine the factors that may increase a person's chance of developing cancer.

Although being infected with certain viruses, such as the human papillomavirus (HPV) and human immunodeficiency virus (HIV), increases the risk of some types of cancer, cancer is not contagious. A person cannot catch cancer from someone who has the disease. Scientists also know that an injury or bruise does not cause cancer.

3. Can cancer be prevented?

People can reduce their chances of getting cancer by not using tobacco products; by choosing foods with less fat and eating more vegetables, fruits, and whole grains; by exercising regularly and avoiding obesity; and by avoiding the harmful rays of the sun. Although many risk factors can be avoided, some, such as inherited conditions, are unavoidable. Still, it is helpful to be aware of them. It is also important to keep in mind that not everyone with a particular risk factor for cancer actually gets the disease; in fact, most do not. People who have an increased likelihood of developing cancer can help protect themselves by avoiding risk factors whenever possible and by getting regular checkups so that, if cancer develops, it is likely to be found early. Treatment is often more effective when cancer is detected early. Screening exams, such as sigmoidoscopy or colonoscopy, mammography, and the Pap test, may also detect precancerous conditions that can be treated before they turn into cancer.

4. What are some of the common signs and symptoms of cancer?

Cancer can cause a variety of symptoms. Possible signs of cancer include the following:

- A thickening or lump in the breast or any other part of the body;
- An obvious change in a wart or mole;
- A sore that does not heal;
- A nagging cough or hoarseness;
- Changes in bowel or bladder habits;
- Indigestion or difficulty swallowing;
- Unexplained changes in weight; and
- Unusual bleeding or discharge.

When these or other symptoms occur, they are **not** always caused by cancer. They can also be caused by infections, benign tumors, or other problems. It is important to see the doctor about any of these symptoms or about other physical changes. Only a doctor can make a diagnosis. A person with these or other symptoms should **not** wait to feel pain; early cancer does not usually cause pain.

If symptoms occur, the doctor may order various tests and may recommend a biopsy. A biopsy is usually the most reliable way to know whether a medical problem is cancer. During a biopsy, the doctor removes a sample of tissue from the abnormal area. A pathologist studies the tissue under a microscope to check for cancer cells.

5. How is cancer treated?

Cancer treatment can include surgery, radiation therapy, chemotherapy, hormone therapy, and biological therapy. The doctor may use one method or a combination of methods, depending on the type and location of the cancer, whether the disease has spread, the patient's age and general health, and other factors. Because treatment for cancer also

damages healthy cells and tissues, it often causes side effects. Some patients may worry that the side effects of treatment are worse than the disease. However, patients and doctors generally discuss the treatment options, weighing the likely benefits of killing cancer cells and the risks of possible side effects. Doctors can suggest ways to reduce or eliminate problems that may occur during and after treatment.

Surgery is a procedure to remove the cancer. The side effects of surgery depend on many factors, including the size and location of the tumor, the type of operation, and the patient's general health. Patients have some pain after surgery, but this pain can be controlled with medicine. It is also common for patients to feel tired or weak for a while after surgery.

Patients may worry that having a biopsy or other type of surgery for cancer will spread the disease. This is a very rare occurrence because surgeons take special precautions to prevent cancer from spreading during surgery. Exposing cancer to air during surgery does not cause the disease to spread.

Radiation therapy (also called radiotherapy) uses high-energy rays to kill cancer cells in a targeted area. Radiation can be given externally by a machine that aims radiation at the tumor area. It can also be given internally; a small container containing a radioactive substance is implanted near the cancer. Radiation treatments are painless. The side effects are usually temporary, and most can be treated and controlled. Patients are likely to feel very tired, especially in the later weeks of treatment. Radiation therapy may also cause a decrease in the number of white blood cells, which help protect the body against infection. With external radiation, it is also common to have temporary hair loss in the treated area and for the skin to become red, dry, tender, and itchy.

There is no risk of radiation exposure from coming in contact with a patient undergoing external radiation therapy. External radiation does not cause the body to become radioactive. With internal radiation, a patient may need to stay in the hospital away from other people while the radiation is most active. The radioactive substance loses radiation quickly and becomes non-radioactive in a short time. Once the implant is removed, there is no radioactivity in the body.

Chemotherapy is the use of drugs to kill cancer cells throughout the body. The doctor may use one drug or a combination of drugs. Because the drug travels throughout the body, healthy cells are also affected. The side effects of chemotherapy depend mainly on the drugs and the dose the patient receives. Hair loss is a common side effect of chemotherapy; however, not all anticancer drugs cause loss of hair. Anticancer drugs may also cause fatigue, infections, poor appetite, nausea and vomiting, diarrhea, or mouth and lip sores. Drugs that prevent or reduce nausea and vomiting can help with some of these side effects. Normal cells usually recover when chemotherapy is over, so most side effects gradually go away after treatment ends.

Hormone therapy is used to treat certain cancers that depend on hormones for their growth. Hormone therapy keeps cancer cells from using the hormone they need to grow.

This treatment may include the use of drugs that stop the production of certain hormones or that change the way hormones work. Another type of hormone therapy is surgery to remove organs that make hormones. For example, the ovaries may be removed to treat breast cancer. The testicles may be removed to treat cancer of the prostate.

Hormone therapy can cause a number of side effects. Patients may feel tired, or have fluid retention, weight gain, hot flashes, nausea and vomiting, changes in appetite, and, in some cases, blood clots. Hormone therapy may also cause problems with fertility. Depending on the type of hormone therapy used, these side effects may be temporary, long-lasting, or permanent.

Biological therapy stimulates the body's immune system to fight disease and can lessen some of the side effects of cancer treatment. Monoclonal antibodies, interferon, interleukin-2, and colony-stimulating factors are some types of biological therapy.

The side effects caused by biological therapy vary with the specific treatment. In general, these treatments tend to cause flu-like symptoms, such as chills, fever, muscle aches, weakness, loss of appetite, nausea, vomiting, and diarrhea. Patients also may bleed or bruise easily, get a skin rash, or have swelling. These problems can be severe, but they go away after the treatment stops.

6. Are clinical trials a treatment option for cancer?

Clinical trials (research studies with people) are an important treatment option for cancer patients. Doctors conduct clinical trials to learn about the effectiveness and side effects of new treatments. Through research, doctors learn new ways to treat cancer that may be more effective than the standard therapy. In some studies, all patients receive the new treatment. In other studies, doctors compare different therapies by giving the new treatment to one group of patients and the standard therapy to another group. Clinical trials follow strict guidelines and have procedures to protect the safety of the people who join the study. Research like this has led to significant advances in the treatment of cancer. People who take part in these studies have the first chance to benefit from treatments that have shown promise. These patients also make an important contribution to medical science.

7. Does cancer always cause pain?

Having cancer does **not** always mean having pain. Whether a patient has pain may depend on the type of cancer, the extent of the disease, and the patient's tolerance for pain. Most pain occurs when the cancer grows and presses against bones, organs, and nerves. Pain may also be a side effect of treatment. However, pain can generally be relieved or reduced with prescription medicines or over-the-counter drugs recommended by the doctor. Other ways to reduce pain, such as relaxation exercises, may also be useful. Pain should not be accepted as a normal part of having cancer. It is important for patients to talk about pain so steps can be taken to help relieve it. The fear of addiction or "losing control" should not stop patients from taking pain medication. Patients who take cancer

pain medicines, as prescribed by their doctor, rarely become addicted to them. In addition, changing the dose or type of medication can usually help if the patient has troublesome side effects.

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Sources of National Cancer Institute Information

Cancer Information Service

Toll-free: 1–800–4–CANCER (1–800–422–6237)
TTY (for deaf and hard of hearing callers): 1–800–332–8615

NCI Online

Internet

Use http://cancer.gov to reach the NCI's Web site.

LiveHelp

Cancer Information Specialists offer online assistance through the *LiveHelp* link on the NCI's Web site.

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