

How Cancer Is Diagnosed: Tests and Biopsies

There is no single test that can diagnose cancer. Doctors may ask about your history, do a physical exam, and order lab tests, imaging scans, or a biopsy. A biopsy—removing a tissue sample to look at under a microscope—is often the only way to tell for sure if you have cancer.

This page is for anyone who is being checked for possible cancer. It explains the lab tests, scans, and biopsies doctors use, and what happens after a diagnosis.

The simple version

You may have a symptom, or a screening test result that suggests cancer. Your doctor will then work to find out whether cancer is the cause, or something else is. There is no single test that can diagnose cancer.

So your doctor may start by asking about your personal and family medical history and doing a physical exam. They may order lab tests, imaging tests (scans), or other tests and procedures. You may also need a biopsy. That is often the only way to tell for sure if you have cancer.

No one test proves cancer — doctors put together several tests to reach a diagnosis.

Making sense of test results

Results from lab tests, imaging, and biopsies are often posted in your patient portal before your doctor can discuss them with you. It is normal to feel anxious and to want to know right away what the results are and what they mean. But your doctor is the best person to explain the results from all your tests and what they mean for you.

Lab tests

High or low levels of certain substances in your body can be a sign of cancer. So lab tests of your blood, urine, and other body fluids can help doctors make a diagnosis. However, abnormal lab results are not a sure sign of cancer. Lab results are used along with the results of other tests, such as biopsies and imaging.

Lab results for healthy people vary from person to person. Even your own results can vary from day to day. Because of this, results are often reported as a range with lower and upper limits. For many tests, you can have normal results even if you have cancer. You can also have results outside

the normal range even if you are healthy. This is why lab tests alone can't say for sure if you have cancer.

Some common lab tests used to help diagnose cancer include:

- **Blood chemistry test** — measures certain substances released into the blood by organs and tissues. It shows how well your kidneys, liver, and other organs are working.
- **Complete blood count (CBC)** — measures the numbers of red blood cells, white blood cells, and platelets, along with other details. It can help diagnose some cancers, especially leukemias.
- **Cytogenetic analysis** — looks for changes in chromosomes, which can be a sign of some cancers.
- **Immunophenotyping** — uses antibodies to identify cells. It helps diagnose and monitor blood cancers such as leukemias and lymphomas.
- **Liquid biopsy** — a blood test that looks for cancer cells or pieces of tumor DNA in the blood.
- **Sputum cytology** — looks for abnormal cells in mucus coughed up from the lungs. It can help diagnose lung cancer.
- **Tumor marker tests** — measure substances made by cancer cells, or made by the body in response to cancer.
- **Urinalysis and urine cytology** — examine urine and the cells in it. They can help diagnose kidney and bladder cancers.

Imaging tests

Imaging tests make pictures of the inside of your body. They help the doctor see whether a tumor is there. These pictures can be made in several ways:

- **CT scan** — uses an X-ray machine linked to a computer to take a series of pictures from different angles, creating detailed 3-D images. Sometimes a dye (contrast material) is used to highlight certain areas.
- **MRI** — uses a powerful magnet and radio waves to take pictures of the body in slices. A special dye can make tumors show up brighter.
- **Nuclear scan** — uses a small amount of radioactive material (a tracer) that collects in certain bones or organs. A scanner then detects it.
- **Bone scan** — a type of nuclear scan that checks for abnormal areas in the bones. Areas where the material collects are called "hot spots."
- **PET scan** — a type of nuclear scan that shows areas where glucose is taken up. Cancer cells often take up more glucose, so the pictures can help find cancer.
- **Ultrasound** — uses high-energy sound waves that echo off tissues to create pictures (a sonogram).
- **X-rays** — use low doses of radiation to create pictures inside your body.

Biopsy

In most cases, doctors need to do a biopsy to be certain that you have cancer. A biopsy is a procedure in which the doctor removes a sample of abnormal tissue. A pathologist looks at the tissue under a microscope and runs other tests on the cells. They then describe the findings in a pathology report, which contains details about your diagnosis. This information can also help show which treatment options might work for you.

A biopsy sample may be taken in several ways:

- **With a needle** — the doctor uses a needle to withdraw tissue or fluid. This is used for bone marrow aspirations, spinal taps, and some breast, prostate, and liver biopsies.
- **With endoscopy** — the doctor inserts a thin, lighted tube called an endoscope into a natural body opening, such as the mouth or anus, and removes tissue through it. Examples include colonoscopy (colon and rectum) and bronchoscopy (airways and lungs).
- **With surgery** — a surgeon removes abnormal cells during an operation. In an excisional biopsy, the entire abnormal area is removed, often with some surrounding normal tissue. In an incisional biopsy, only part of the abnormal area is removed.

Some biopsies may require a sedative (medicine that helps you relax or sleep) or anesthesia (drugs that keep you from feeling pain). Anesthesia can be local (one small area), regional (a part of the body such as an arm or leg), or general (loss of feeling and awareness, like a deep sleep).

After a cancer diagnosis

If the biopsy and other tests show that you have cancer, you may have more tests to help your doctor plan treatment. For instance, your doctor may do other tests to find out if the cancer has spread and how far. This information is important for knowing the stage of your cancer.

For some cancers, other studies find the grade of the tumor, which is how abnormal the cells look. Others study tumor markers to learn which risk group you fall into. Your tumor may also be tested for other tumor markers or biomarkers. All of this information is important for deciding on the best treatment.

A cancer diagnosis is usually the start of more testing — each step helps the team tailor treatment to you.

When to get help sooner

A biopsy is a procedure, and some need sedation, so it helps to know which changes afterward should not wait.

- **Call 911 or go to an emergency department if** you have trouble breathing, chest pain, or you cannot rouse someone who was sedated for a procedure. Do not drive yourself.
- **Call your care team right away if** bleeding from a biopsy site does not stop after about ten minutes of firm pressure, or if the site oozes thick tan, green or yellow fluid.

- **Call your care team right away if** you develop a temperature of 100.4°F (38°C) or higher after a biopsy. If you have already started chemotherapy, that same reading is a medical emergency ([CDC \(cdc.gov/cancer-preventing-infections/patients/fever.html\)](https://www.cdc.gov/cancer-preventing-infections/patients/fever.html)): phone your cancer team at once, whatever the hour, and if you cannot get through quickly, go to an emergency department and tell them on arrival that you are on chemotherapy.
- **Call your care team within a day or two if** the biopsy area becomes more red, swollen or painful instead of less.

Sources

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Source: National Cancer Institute (cancer.gov/about-cancer/diagnosis-staging/diagnosis)

Last updated: 2026-09-29

Online: cancerexplained.org/diagnosis/cancer-diagnosis

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