



# Early Detection, Diagnosis, and Staging

## Detection and Diagnosis

Catching cancer early often allows for more treatment options. Some early cancers may have signs and symptoms that can be noticed, but that is not always the case.

- [Can Adrenal Cancer Be Found Early?](#)
- [Signs and Symptoms of Adrenal Cancers](#)
- [How Is Adrenal Cancer Diagnosed?](#)

## Stages and Outlook (Prognosis)

After a cancer diagnosis, staging provides important information about the extent of cancer in the body and anticipated response to treatment.

- [How Is Adrenal Cancer Staged?](#)
- [Survival Rates By Stage for Adrenal Cancer](#)

## Questions to Ask About Adrenal Cancer

Here are some questions you can ask your cancer care team to help you better understand your cancer diagnosis and treatment options.

- [What Should You Ask Your Doctor About Adrenal Cancer?](#)

# Can Adrenal Cancer Be Found Early?

It is hard to find adrenal carcinomas early and they are often quite large when diagnosed. Adrenal carcinomas are often found earlier in children than in adults because adrenal cancers in children more commonly secrete hormones. Children will show outward signs of excess hormone production early. For example they may

develop very early signs of puberty due to the sex hormones that sometimes are produced by adrenal cancer. In adults, these tumors may be found early by accident, when a [CT \(computed tomography\) scan](#) is done for some other health concern.

The American Cancer Society has official [recommendations for the early detection of several types of cancer](#). Because adrenal cancers occur so rarely, the Society does not recommend routine testing for this cancer in people without any symptoms.

- [References](#)

[See all references for Adrenal Cancer](#)

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## Signs and Symptoms of Adrenal Cancers

In about half of people with adrenal cancer, symptoms are caused by the hormones made by the tumor. In the other half, symptoms occur because the tumor has grown so large that it presses on nearby organs. If you or your child has any of the signs or symptoms described in this section, discuss them with your doctor without delay. These symptoms may be caused by an adrenal tumor or by something else. Getting the proper medical tests is the only way to find out. The sooner you get a correct diagnosis, the sooner you can start treatment and the more effective your treatment will be.

### Symptoms caused by androgen or estrogen production

In children, the symptoms are most often caused by the *androgens* (male-type hormones) that the tumor might secrete. The most common symptoms are excessive growth of facial and body hair (such as in the pubic and underarm areas). Male hormones may also enlarge the penis in boys or the clitoris in girls.

If the tumor secretes estrogens (female-type hormones), girls can start puberty early.

This can cause the breasts to develop and menstrual periods to start. Estrogen-producing tumors also may enlarge breasts in boys.

The symptoms from high levels of sex hormones are less noticeable in adults because they have already gone through puberty and have breasts and adult patterns of body hair. Women with estrogen-producing tumors and men with androgen-producing tumors usually do not have any symptoms from the hormones, and so may have no symptoms until the tumor is large enough to press on nearby organs.

Symptoms are easier to notice if the tumor is making the hormone usually found in the opposite sex. For example, men with tumors that make estrogen (female hormone) may notice breast enlargement with tenderness. They may also have sexual problems such as erectile dysfunction (impotence) and loss of sex drive. Women with tumors that make androgens (male hormones) may notice excessive facial and body hair growth, receding hairline, irregular menstrual periods, and deepening of their voice.

## Symptoms caused by cortisol production

Excessive levels of cortisol causes a problem known as *Cushing syndrome*. Some people have all of these symptoms, but many people with high cortisol levels have only 1 or 2 symptoms. These signs and symptoms include:

- Weight gain, usually greatest above the collar bone and around the abdomen
- Fat deposits behind the neck and shoulders
- Purple stretch marks on the abdomen
- Excessive hair growth on the face, chest, and back in women
- Menstrual irregularities
- Weakness and loss of muscle mass in the legs
- Easy bruising
- Depression and/or moodiness
- Weakened bones (osteoporosis), which can lead to fractures
- High blood sugar, often leading to diabetes
- High blood pressure

Cushing syndrome may be caused by an adrenal cancer or an adrenal adenoma that produces high levels of cortisol and/or related hormones. Benign pituitary gland tumors can produce high levels of another hormone called *adrenocorticotropic hormone* (ACTH). This is often called *Cushing disease*. The high levels of ACTH in turn cause normal adrenal gland tissue to produce more cortisol. This results in the same symptoms as Cushing syndrome. Very rarely ACTH can be produced by other tumors and cause the same symptoms.

Some people with immune system problems or some cancers, such as lymphomas, are treated with drugs chemically related to cortisol. Because there are so many causes of high cortisol levels that can lead to Cushing syndrome, doctors do a number of [tests](#) to find out whether the patient has an adrenal cortical tumor or some other cause of Cushing syndrome.

## Symptoms caused by aldosterone production

The main signs and symptoms caused by aldosterone-producing adrenal tumors are:

- High blood pressure
- Weakness
- Muscle cramps
- Low blood potassium levels

Adrenal adenomas often produce aldosterone, but adrenal cancers rarely do so.

## Symptoms caused by a large adrenal cancer pressing on nearby organs

As an adrenal cancer grows, it presses on nearby organs and tissues. This may cause pain near the tumor, a feeling of fullness in the abdomen, or trouble eating because of a feeling of filling up easily.

- [References](#)

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## How Is Adrenal Cancer Diagnosed?

### Medical history and physical exam

The first step is for the doctor to take your complete medical history to check for any symptoms. Your doctor will want to know if anyone in your family has had adrenal cancer or any other type of cancer. Your doctor will also ask about your menstrual or sexual function and about any other symptoms that you may be having. A physical exam will give other information about signs of adrenal gland cancer and other health problems. Your doctor will thoroughly examine your abdomen for evidence of a tumor (or mass).

Your blood and urine will be tested to look for high levels of the hormones produced by some adrenal adenomas and carcinomas. If an adrenal tumor or cancer is suspected, imaging tests will be done to look for a tumor. These tests can also help see if it has spread.

If a mass is seen on an imaging test and it is likely to be an adrenal cancer, doctors will recommend surgery to remove the cancer. Generally, doctors do not recommend a biopsy (removing a sample of the tumor to look at under the microscope to see if it is cancer) before surgery to remove the tumor. That is because doing a biopsy can increase the risk that an adrenal cancer will spread outside of the adrenal gland.

## Imaging tests

### Chest x-ray

A [chest x-ray](#) can show if the cancer has spread to the lungs. It may also be useful to determine if there are any serious lung or heart diseases.

### Ultrasound

[Ultrasound tests](#) use sound waves to take pictures of parts of the body. A device called a *transducer* produces the sound waves, which are reflected by tissues of nearby organs. The pattern of sound wave echoes is detected by the transducer and analyzed by a computer to create an image of these tissues and organs. This test can show if there is a tumor mass in the adrenal gland. It can also diagnose tumor masses in the liver if the cancer has spread there. In general, it is not used to look for adrenal tumors unless a CT scan isn't able to be done.

### Computed tomography (CT)

[CT scans](#) show the adrenal glands fairly clearly and often can confirm the location of the cancer. It can also help show whether your cancer has spread into your liver or other

organs nearby. CT scans can also show lymph nodes and distant organs where metastatic cancer might be present. The CT scan can help determine if surgery is a good treatment option.

The CT scan is an x-ray procedure that produces detailed cross-sectional images of your body. CT scans take longer than regular x-rays. Instead of taking one picture, like a conventional x-ray, a CT scanner takes many pictures as the camera rotates around you. A computer then combines these pictures into an image of a slice of your body. The machine will take pictures of many slices of the part of your body that is being studied.

## **Positron emission tomography (PET)**

In [PET](#), radioactive glucose (sugar) is injected into the patient's vein. Because cancer cells use sugar much faster than normal tissues, radioactivity will tend to concentrate in the cancer. A scanner can spot the radioactive deposits. This test can be helpful in spotting small collections of cancer cells and may be used to find cancer that has spread. It also may help in deciding if an adrenal tumor is likely to be benign or malignant (cancer).

## **Magnetic resonance imaging (MRI)**

[MRI scans](#) use radio waves and strong magnets instead of x-rays. The energy from the radio waves is absorbed and then released in a pattern formed by the type of tissue and by certain diseases. A computer translates the pattern of radio waves given off by the tissues into a very detailed image of parts of the body. Not only does this produce cross sectional slices of the body like a CT scanner, it can also produce slices that are parallel with the length of your body. For some MRI scans, a contrast material called *gadolinium* is injected into a vein (IV). MRI may sometimes provide more information than CT scans because it can better distinguish adrenal cancers from benign tumors.

MRI scans are particularly helpful in examining the brain and spinal cord. In people with suspected adrenal tumors, an MRI of the brain may be done to examine the pituitary gland. Tumors of the pituitary gland, which lies underneath the front of the brain, can cause symptoms and signs similar to adrenal tumors.

## **Other tests**

### **Laparoscopy**

This procedure uses a laparoscope, a thin, flexible tube with a tiny video camera on the end. It is inserted through a small surgical opening in the patient's side to allow the surgeon to see where the cancer is growing. It can spot distant spread as well as enlarged lymph nodes. Sometimes it is combined with ultrasound to give a better picture of the cancer. Laparoscopy may be done to help predict whether it will be possible to completely remove the cancer by surgery. In addition to viewing adrenal tumors through the laparoscope, surgeons can sometimes remove small benign adrenal tumors through this instrument. This method is described in the section, "[Surgery for adrenal cancer.](#)"

## **Biopsy**

Imaging tests may find tumors, but often the only way to know for sure that a tumor is cancer is to remove a sample of tumor tissue to look at under the microscope. This is called a *biopsy*. If a thin needle that only removes tiny bits of tissue is used, it is called a *fine needle aspiration*, or FNA. When a larger needle that removes a thin cylindrical core of tissue is used, it is called a *core needle biopsy*. In either case, the biopsy is often done using a CT scan or ultrasound to guide the tip of the needle into the tumor.

Since adrenal adenomas and cancers can look alike under the microscope, a biopsy may not be able to tell whether or not an adrenal tumor is cancerous. Also, a needle biopsy of an adrenal cancer can actually spread tumor cells. For these reasons, a biopsy is generally not done before surgery if an adrenal tumor's size and certain features seen on imaging tests suggest it is cancer. A work-up with blood tests for hormone production and imaging studies are more useful than biopsies in the diagnosis of adrenal cancer.

If the cancer appears to have metastasized (spread) to another part of the body such as the liver, then a needle biopsy of the metastasis may be done. If a patient is known to have an adrenal tumor and a liver biopsy shows adrenal cells are present in the liver, then the tumor is cancer.

In general, a biopsy is only obtained in a patient with adrenal cancer when there are tumors outside the adrenals and the doctor needs to know if these are spread (metastases) from an adrenal cancer or are caused by some other cancer or disease. Adrenal tumors are sometimes biopsied when the patient is known to have a different type of cancer (like lung cancer) and knowing that it has spread to the adrenal glands would alter treatment.

## **Tests for adrenal hormones**

Blood and urine tests to measure levels of adrenal hormones are important in deciding whether a patient with signs and symptoms of adrenal cancer has the disease. For urine tests, you may be asked to collect all of your urine for 24 hours. Blood and urine tests are as important as imaging tests in diagnosing adrenal cancer. Doctors choose which tests to do based on the patient's symptoms. Doctors know which symptoms are associated with high levels of certain hormones, so they can focus on ways to look for the hormones most likely to be affected. Often doctors will check hormone levels even when symptoms of high hormone levels are not present. This is because symptoms of abnormal hormone levels can be very subtle and blood tests may even be able to detect changes in hormone levels before symptoms occur.

### **Tests for high cortisol levels**

The levels of cortisol are measured in the blood and in the urine. If an adrenal tumor is making cortisol, these levels will be abnormally high. These tests may be done after giving the patient a dose of dexamethasone. Dexamethasone is a drug that acts like cortisol. If given to someone who does not have an adrenal tumor, it will decrease production of cortisol and similar hormones. In someone with an adrenal cortex tumor, these hormone levels will remain high after they receive dexamethasone. Blood levels of ACTH will also be measured to help distinguish adrenal tumors from other diseases that can cause high cortisol levels.

### **Tests for high aldosterone levels**

The level of aldosterone will be measured and will be high if the tumor is making aldosterone. Also, high aldosterone leads to low levels of potassium and renin (a hormone produced by the kidneys) in their blood.

### **Tests for high androgen or estrogen levels**

Patients with androgen-producing tumors will have high levels of dehydroepiandrosterone sulfate (DHEAS) or testosterone. Patients with estrogen-producing tumors will have high levels of estrogen in their blood.

- [References](#)

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## How Is Adrenal Cancer Staged?

**Staging** is the process of finding out how far the cancer has spread. It's very important because treatment options and the course of the disease as well as prognosis (outlook) are determined by the stage of the cancer. Two major staging systems are used: the American Joint Committee on Cancer (AJCC) **TNM** staging system and the ENSAT (European Network for the Study of Adrenal Tumors) staging system. Both are based on the same TNM categories. They differ on how they combine those categories to determine the final stage (this is known as *stage grouping*).

TNM describes 3 key pieces of information:

- **T** indicates the size of the main (primary) **tumor** and whether it has grown into nearby areas.
- **N** describes how much the cancer has spread to nearby (regional) lymph **nodes**. Lymph nodes are small bean-shaped collections of immune system cells that are important in fighting infections.
- **M** indicates whether the cancer has spread (**metastasized**) to other organs of the body (the most common site is the liver).

Numbers or letters appearing after T, N, and M provide more details about each of these factors. The numbers 0 through 4 indicate increasing severity. The letter X means *cannot be assessed because the information is not available*.

Once the values for T, N, and M are determined, they are combined together to decide the stage. This is called stage grouping.

### T categories for adrenal cancer

**T1:** the tumor is 5 cm (about 2 inches) or less in size and it has not grown into tissues outside the adrenal gland

**T2:** the tumor is greater than 5 cm (2 inches) in size and it has not grown into tissues outside the adrenal gland

**T3:** the tumor is growing in the fat that surrounds the adrenal gland. The tumor can be any size.

**T4:** the tumor is growing into nearby organs, such as the kidney, pancreas, spleen, and liver. The tumor can be any size.

## **N categories**

**N0:** the cancer has not spread to nearby lymph nodes

**N1:** the cancer has spread to nearby lymph nodes

## **M categories**

**M0:** the cancer has not spread to distant organs or tissues (like liver, bone, brain)

**M1:** the cancer has spread to distant sites

## **Stage groupings for adrenal cancer in the AJCC system**

### **Stage I**

**T1, N0, M0:** The cancer is smaller than 5 cm (2 inches) and has not grown into surrounding tissues or organs. The cancer has not spread to lymph nodes (N0) or other body parts (M0).

### **Stage II**

**T2, N0, M0:** The cancer is larger than 5 cm (2 inches) but still has not grown into surrounding tissues or organs. The cancer has not spread to lymph nodes (N0) or other body parts (M0).

### **Stage III**

Either of the following:

**T1 or T2, N1, M0:** The tumor can be any size but it has not started growing outside the adrenal gland (T1 or T2). The cancer has spread to nearby lymph nodes (N1) but not to distant sites (M0).

OR

**T3, N0, M0:** The cancer has grown into the fat outside the adrenal gland (T3). It has not spread to nearby lymph nodes (N0) or to distant sites (M0).

## **Stage IV**

Either of the following:

**T3, N1, M0:** the cancer has grown into the fat outside of the adrenal gland (T3) and it has spread to nearby lymph nodes (N1); it has not spread to distant body sites (M0)

OR

**T4, N0 or N1, M0:** the cancer has grown from the adrenal gland into organs or tissues nearby (T4) It may (N1) or may not (N0) have spread to nearby lymph nodes, but it has not spread to distant sites (M0)

OR

**Any T, any N, M1:** The cancer has spread to distant sites (M1). It can be any size and may or may not have spread to nearby tissues or lymph nodes.

## **Stage groupings for adrenal cancer in the ENSAT system**

In the ENSAT system, stages I and II are the same as they are in the AJCC system. Stages III and IV are different.

### **Stage III**

Either

**T3 or T4, N0, M0:** the cancer has grown into the fat outside of the adrenal gland (T3) or into nearby organs or tissues (T4). It has not spread to nearby lymph nodes (N0) or to distant sites (M0).

OR

**Any T, N1, M0:** the cancer can be any size and may have grown into nearby tissues (any T). It has spread to nearby lymph nodes (N1), but not to distant sites (M0).

## Stage IV

**Any T, any N, M1:** The cancer has spread to distant sites (M1). It can be any size and may or may not have spread to nearby tissues or lymph nodes.

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# Survival Rates By Stage for Adrenal Cancer

Survival rates are often used by doctors as a standard way of discussing a person's prognosis (outlook). Some patients with cancer want to know the survival statistics for people in similar situations, while others might not find the numbers helpful, or not want to know them. If you decide you don't want to know them, stop reading here and skip to the [next section](#).

The 5-year survival rate refers to the percentage of patients who live *at least 5 years* after their cancer is diagnosed. Of course, many people live much longer than 5 years (and many are cured).

Five-year *relative* survival rates assume that some people will die of other causes and compare the observed survival with that expected for people without the cancer. This is a better way to see the impact of the cancer on survival.

In order to get 5-year survival rates, doctors have to look at people who were treated at least 5 years ago. Improvements in treatment since then may result in a more favorable outlook for people now being diagnosed with adrenal cortical cancer.

Survival rates are often based on previous outcomes of large numbers of people who had the disease, but they cannot predict what will happen in any particular person's case. Many other factors besides stage can affect a person's outlook, such as the grade of their cancer, the treatment they receive, their age, and overall health. Your doctor can tell you how the numbers below may apply to you, as he or she is familiar with the aspects of your particular situation.

The numbers below come from the National Cancer Institute's SEER database, and are based on people diagnosed between 1988 and 2001. The SEER database does not list survival statistics by AJCC or ENSAT stages. Instead, it divides patients into 3 groups: localized, regional, and distant. **Localized** means that the cancer hasn't grown outside of the adrenal gland at diagnosis (like stages I and II). **Regional** means that the cancer has grown into nearby tissues or has spread to nearby lymph nodes (like ENSAT stage III). **Distant** means that the cancer has spread further to distant sites (like ENSAT stage IV).

- |                |                                   |
|----------------|-----------------------------------|
| • <b>Stage</b> | • <b>5-year Relative Survival</b> |
| • Localized    | • 65%                             |
| • Regional     | • 44%                             |
| • Distant      | • 7%                              |

- [References](#)

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## What Should You Ask Your Doctor About Adrenal Cancer?

As you deal with your adrenal cancer and the process of treatment, you should be able to have frank, open discussions with your cancer care team. Ask any questions, no matter how trivial they might seem. Among the questions you might want to ask are:

- Do I have a benign or malignant adrenal gland tumor?

- Has my cancer spread beyond the adrenal gland?
- Is my tumor secreting excessive amounts of hormones?
- How will we treat the hormone excess?
- Are the changes to my body permanent?
- How will we treat the changes to my body?
- Is this form of adrenal gland cancer hereditary? Does my adrenal gland cancer affect any other organs?
- What other [treatment](#) choices do I have?
- What [side effects](#) can I expect from my treatments?
- What are the other risks of treatments?
- How long will it take me to recover from treatment?
- When can I go back to work after treatment?
- What are the chances that my cancer will come back?
- What should I do to be ready for treatment?
- Do I need a second opinion?
- Based on what you've learned about my cancer, will it shorten my life?

You will no doubt have other questions about your personal situation. Be sure and write your questions down so you remember to ask them during each visit with your cancer care team. Keep in mind, too, that doctors are not the only ones who can provide you with information. Other health care professionals, such as nurses and social workers, may have the answers you seek. You can find more information about communicating with your health care team in our document [The Doctor-Patient Relationship](#).

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