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About Kidney Cancer

Overview and Types

If you have been diagnosed with kidney cancer or are worried about it, you likely have a lot of questions. Learning some basics is a good place to start.

- [What Is Kidney Cancer?](#)

Research and Statistics

See the latest estimates for new cases of kidney cancer and deaths in the US and what research is currently being done.

- [Key Statistics About Kidney Cancer](#)
 - [What's New in Kidney Cancer Research and Treatment?](#)
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What Is Kidney Cancer?

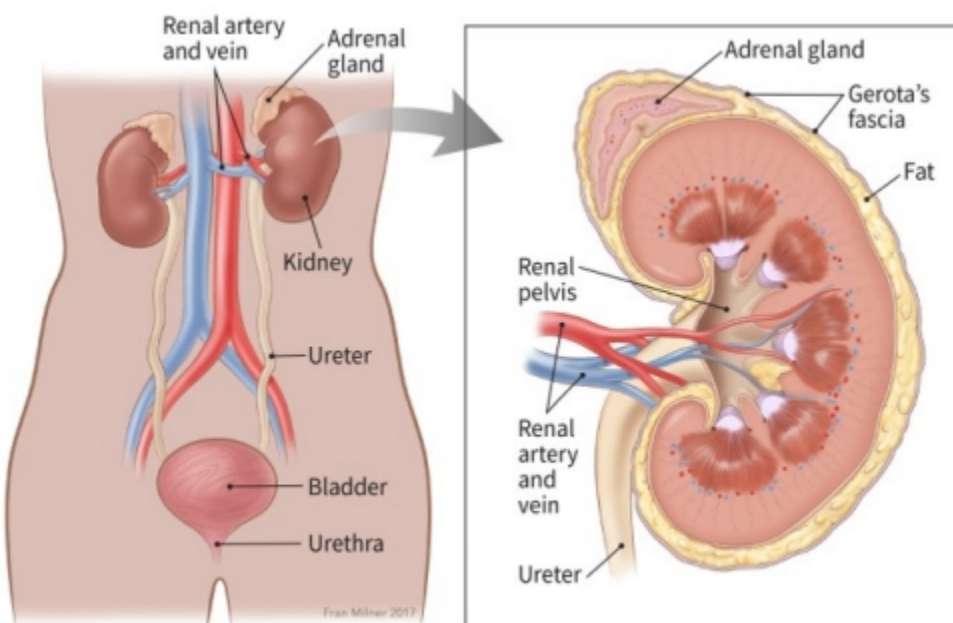
Kidney cancer is a cancer that starts in the kidneys. Cancer starts when cells in the body begin to grow out of control. Cells in nearly any part of the body can become cancer, and can spread to other areas. To learn more about how cancers start and spread, see [What Is Cancer?](#)¹

About the kidneys

To understand more about kidney cancer, it helps to know about the kidneys and what they do.

The kidneys are a pair of bean-shaped organs, each about the size of a fist. They are attached to the upper back wall of the abdomen and protected by the lower rib cage. One kidney is just to the left and the other just to the right of the backbone.

Small glands called *adrenal glands* sit above each of the kidneys. Each kidney and adrenal gland is surrounded by fat and a thin, fibrous layer known as *Gerota's fascia*.



The kidneys' main job is to filter the blood coming in from the renal arteries to remove excess water, salt, and waste products. These substances become urine. Urine leaves the kidneys through long slender tubes called *ureters* which connect to each kidney at an area called the *renal pelvis*. Urine travels down the ureters to the bladder, where it is stored until you urinate (pee).

The kidneys also have other jobs:

- They help control blood pressure by making a hormone called *renin*.
- They help make sure the body has enough red blood cells by making a hormone called *erythropoietin*. This hormone tells the bone marrow to make more red blood cells.

Our kidneys are important, but we can function with only one kidney. Many people in the

United States are living normal, healthy lives with just one kidney.

Some people do not have any working kidneys at all, and survive with the help of a medical procedure called *dialysis*. The most common form of dialysis uses a specially designed machine that filters blood much like a real kidney would.

Types of kidney cancer

Renal cell carcinoma

Renal cell carcinoma (RCC), also known as *renal cell cancer* or *renal cell adenocarcinoma*, is by far the most common type of kidney cancer. About 9 out of 10 kidney cancers are renal cell carcinomas.

Although RCC usually grows as a single tumor within a kidney, sometimes there are 2 or more tumors in one kidney or even tumors in both kidneys at the same time.

There are several subtypes of RCC, based mainly on how the cancer cells look under a microscope. Knowing the subtype of RCC can be a factor in deciding treatment and can also help your doctor determine if your cancer might be due to an inherited genetic syndrome. See [What Are the Risk Factors for Kidney Cancer?](#)² for more information about inherited kidney cancer syndromes.

Clear cell renal cell carcinoma: this is the most common form of renal cell carcinoma. About 7 out of 10 people with RCC have this kind of cancer. When seen under a microscope, the cells that make up clear cell RCC look very pale or clear.

Papillary renal cell carcinoma: this is the second most common subtype – about 1 in 10 RCCs are of this type. These cancers form little finger-like projections (called *papillae*) in some, if not most, of the tumor. Some doctors call these cancers *chromophilic* because the cells take in certain dyes and look pink under the microscope.

Chromophobe renal cell carcinoma: this subtype accounts for about 5% (5 cases in 100) of RCCs. The cells of these cancers are also pale, like the clear cells, but are much larger and have certain other features that can be recognized when looked at with a microscope .

Rare types of renal cell carcinoma: these subtypes are very rare, each making up less than 1% of RCCs:

- Collecting duct RCC

- Multilocular cystic RCC
- Medullary carcinoma
- Mucinous tubular and spindle cell carcinoma
- Neuroblastoma-associated RCC

Unclassified renal cell carcinoma: rarely, renal cell cancers are labeled as *unclassified* because the way they look doesn't fit into any of the other categories or because there is more than one type of cell present.

Other types of kidney cancers

Other types of kidney cancers include transitional cell carcinomas, Wilms tumors, and renal sarcomas.

Transitional cell carcinoma: of every 100 cancers in the kidney, about 5 to 10 are transitional cell carcinomas (TCCs), also known as *urothelial carcinomas*.

Transitional cell carcinomas don't start in the kidney itself, but in the lining of the renal pelvis (where the ureters meet the kidneys). This lining is made up of cells called *transitional cells* that look like the cells that line the ureters and bladder. Cancers that develop from these cells look like other urothelial carcinomas, such as bladder cancer, under the microscope. Like bladder cancer, these cancers are often linked to cigarette smoking and being exposed to certain cancer-causing chemicals in the workplace.

People with TCC often have the same signs and symptoms as people with renal cell cancer: blood in the urine and, sometimes, back pain.

For more information about transitional cell carcinoma, see [Bladder Cancer](#)³.

Wilms tumor (nephroblastoma): Wilms tumors almost always occur in children. This type of cancer is very rare among adults. To learn more about this type of cancer, see [Wilms Tumor](#)⁴.

Renal sarcoma: renal sarcomas are a rare type of kidney cancer that begin in the blood vessels or connective tissue of the kidney. They make up less than 1% of all kidney cancers.

Sarcomas are discussed in more detail in [Sarcoma- Adult Soft Tissue Cancer](#)⁵.

Benign (non-cancerous) kidney tumors

Some kidney tumors are benign (non-cancerous). This means they do not metastasize (spread) to other parts of the body, although they can still grow and cause problems.

Benign kidney tumors can be treated by removing or destroying them, using many of the same treatments that are also used for kidney cancers, such as surgery, radiofrequency ablation, and arterial embolization. The choice of treatment depends on many factors, such as the size of the tumor and if it is causing any symptoms, the number of tumors, whether tumors are in both kidneys, and the person's general health.

Renal adenoma: renal adenomas are the most common benign kidney tumors. They are small, slow-growing tumors that are often found on imaging tests (such as CT scans) when the doctor is looking for something else. Seen with a microscope, they look a lot like low-grade (slow growing) renal cell carcinomas.

In rare cases, tumors first thought to be renal adenomas turn out to be small renal cell carcinomas. Because they are hard to tell apart, suspected adenomas are often treated like renal cell cancers.

Oncocytoma: oncocytomas are benign kidney tumors that can sometimes grow quite large. As with renal adenomas, it can sometimes be hard to tell them apart from kidney cancers. Oncocytomas do not normally spread to other organs, so surgery often cures them.

Angiomyolipoma: angiomyolipomas are rare. They often develop in people with tuberous sclerosis, a genetic condition that also affects the heart, eyes, brain, lungs, and skin. These tumors are made up of different types of connective tissues (blood vessels, smooth muscles, and fat). If they aren't causing any symptoms, they can often just be watched closely. If they start causing problems (like pain or bleeding), they may need to be treated.

The rest of our information about kidney cancer focuses on renal cell carcinoma and not on less common types of kidney tumors.

Hyperlinks

1. www.cancer.org/cancer/cancer-basics/what-is-cancer.html
2. www.cancer.org/cancer/kidney-cancer/causes-risks-prevention/risk-factors.html
3. www.cancer.org/cancer/bladder-cancer.html
4. www.cancer.org/cancer/wilms-tumor.html
5. www.cancer.org/cancer/soft-tissue-sarcoma.html

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Key Statistics About Kidney Cancer

The American Cancer Society's most recent estimates for kidney cancer in the United States are for 2019:

- About 73,820 new cases of kidney cancer (44,120 in men and 29,700 in women) will occur.
- About 14,770 people (9,820 men and 4,950 women) will die from this disease.

These numbers include all types of kidney and renal pelvis cancers.

Most people with kidney cancer are older. The average age of people when they are diagnosed is 64. Kidney cancer is very uncommon in people younger than age 45.

Kidney cancer is among the 10 most common cancers in both men and women. Overall, the lifetime risk for developing kidney cancer in men is about 1 in 48. The lifetime risk for women is 1 in 83. A number of other factors (described in [Risk Factors for Kidney Cancer](#)¹) also affect a person's risk.

For reasons that are not totally clear, the rate of new kidney cancers has been rising since the 1990s, although this seems to have leveled off in the past few years. Part of this rise was probably due to the use of newer imaging tests such as CT scans, which picked up some cancers that might never have been found otherwise. The death rates for these cancers have gone down slightly since the middle of the 1990s.

Survival rates for people diagnosed with kidney cancer are discussed in [Survival Rates for Kidney Cancer by Stage](#)².

Visit the [American Cancer Society's Cancer Statistics Center](#)³ for more key statistics.

Hyperlinks

1. www.cancer.org/cancer/kidney-cancer/causes-risks-prevention/risk-factors.html
2. www.cancer.org/cancer/kidney-cancer/detection-diagnosis-staging/survival-rates.html
3. <https://cancerstatisticscenter.cancer.org/>

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What's New in Kidney Cancer Research and Treatment?

Research into the [causes](#)¹, [detection](#)², [diagnosis](#)³, and [treatment](#)⁴ of kidney cancer is now being done at many medical centers, university hospitals, and other institutions across the nation.

Genetics

Scientists are studying several genes that seem to play a part in changing normal kidney cells into renal cell carcinoma (RCC).

For example, problems with the [VHL tumor suppressor gene](#)⁵ are found in most clear cell RCCs. This allows other genes such as the hypoxia-inducible factor (*HIF*) gene to be activated when they shouldn't be, which drives a cell toward being cancerous. Some newer treatments focus on attacking this cellular pathway.

Researchers now also have a better idea of the gene changes responsible for some other forms of RCC. Doctors are trying to determine which treatments are most likely to be effective for certain types of RCC. This information can also be used to develop new treatments.

Targeted therapies

Because chemotherapy is not very effective against advanced kidney cancer, [targeted therapies](#)⁶ are now usually the first-line option to treat kidney cancers that cannot be removed by surgery or have spread outside the kidney. At this time they are usually given separately. [Clinical trials](#)⁷ are now under way to see if combining these drugs, either with each other or with other types of treatment, might be better than using them alone.

Neoadjuvant Therapy

The potential roles of giving targeted drugs *before* surgery (called neoadjuvant therapy) are also being studied. The hope with these studies is to shrink tumors to allow for less extensive surgery, prevent cancer spread and hopefully improve cure rates. This could also help people retain more of their normal kidney function.

Adjuvant Therapy

The potential roles of giving targeted drugs *after* surgery (called adjuvant therapy) are also being studied. The hope with these studies is to see if patients at high risk would benefit from taking certain targeted drugs after their kidney cancer surgery to reduce the chances of the cancer coming back.

Along with finding new medicines and looking at the best way to combine and sequence existing ones, a major area of research is finding better ways to choose the best treatment for each person. Researchers are looking for which factors might make a person's cancer more likely to respond to a certain medicine. This can increase the chances of being helped by a therapy and lower the chances a person will get a treatment that is unlikely to help them (and which could still have side effects).

Predicting Survival

Kidney cancer is typically unpredictable. Some cancers are very aggressive, while others can be very slow growing and last for many years. The way a tumor behaves depends on the specific type of kidney cancer it is. Given this, scientists are looking to see if they can more accurately predict how long someone with kidney cancer may live by testing the kidney cancer for specific traits. For example, one test checks how fast the cancer cells are dividing. Many factors of the cancer cell are looked at and a “score” is given to indicate how fast or slow the cells are growing. A lower score seems to match with a better outcome for the patient. More studies are being done in this area.

Immunotherapy

Kidney cancer seems to be one of the cancers most likely to respond to [immunotherapy](#)⁸, which is treatment that boosts the body's immune response against cancer cells. [Clinical trials](#)⁹ of many new immunotherapy methods are being tested. Basic research is now being directed toward a better understanding of the immune system, how to activate it, and how it reacts to cancer.

Hyperlinks

1. www.cancer.org/cancer/kidney-cancer/causes-risks-prevention/what-causes.html
2. www.cancer.org/cancer/kidney-cancer/detection-diagnosis-staging/detection.html
3. www.cancer.org/cancer/kidney-cancer/detection-diagnosis-staging/detection.html
4. www.cancer.org/cancer/kidney-cancer/treating.html
5. www.cancer.org/cancer/kidney-cancer/causes-risks-prevention/what-causes.html

6. www.cancer.org/cancer/kidney-cancer/treating/targeted-therapy.html
7. www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html
8. www.cancer.org/cancer/kidney-cancer/treating/immunotherapy.html
9. www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html

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