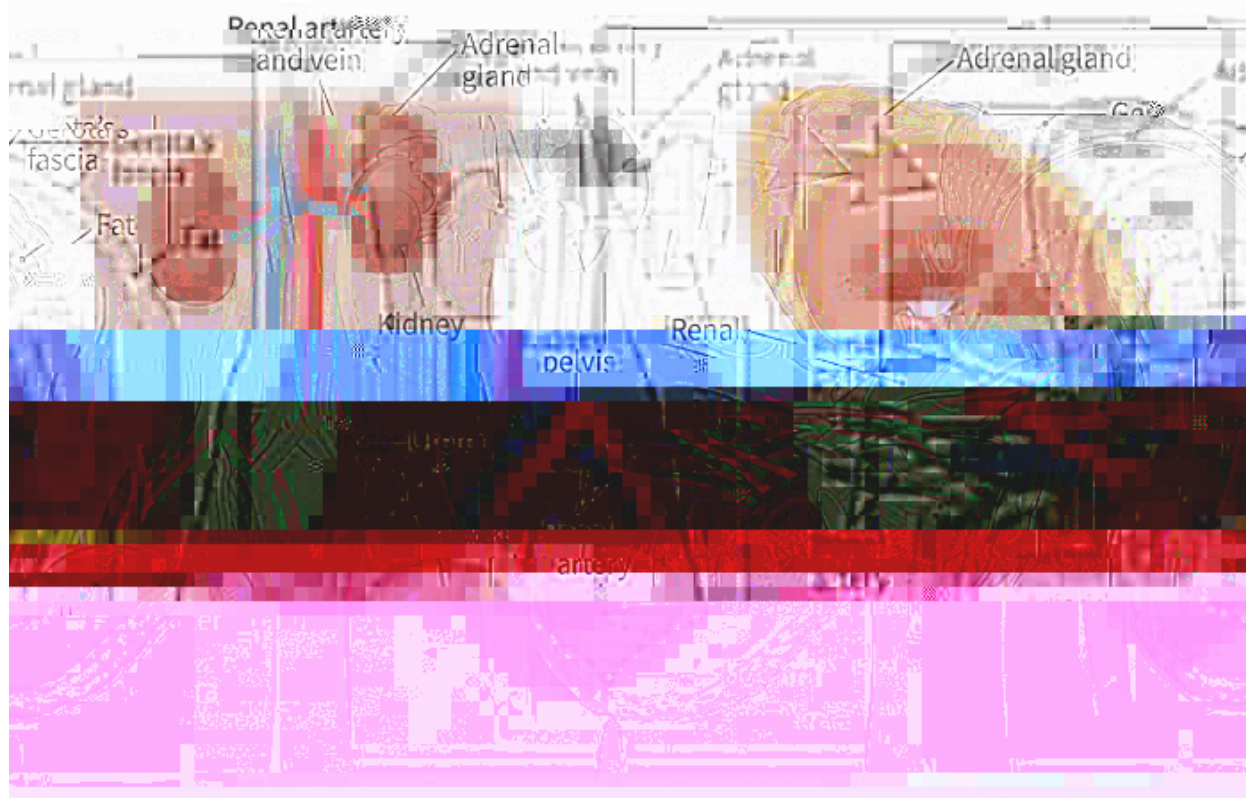

What Is Kidney Cancer?

- [Types of kidney cancer](#)
- [Benign \(non-cancerous\) kidney tumors](#)

The kidneys

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 are protected by the lower rib cage. One kidney is just to the left and the other just to the right of the backbone.

An **adrenal gland** sits on top of each kidney. Each kidney and adrenal gland are surrounded by fat and a thin, fibrous layer known as **Gerota's fascia**.



[What Is Cancer?](#) ¹

Cancer starts when cells in the body begin to grow out of control. Cells in nearly any part of the body can become cancer cells. Learn more here.

[Anatomy Gallery: Female Genitourinary System](#) ²

Explore our 3D interactive tour of the female genitourinary system.

[Anatomy Gallery: Male Genitourinary System](#) ³

Explore our 3D interactive tour of the male genitourinary system.

The kidneys' main job is to remove excess water, salt, and waste products from blood coming in from the renal arteries. These substances become urine. Urine collects in the center of each kidney in an area called the **renal pelvis** and then leaves the kidneys through long slender tubes called **ureters**. The ureters lead to the bladder, where the urine is stored until you urinate.

The kidneys also have other jobs:

- They make a hormone called **renin** that helps control blood pressure.
- 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 our bodies 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 working kidneys at all, and live 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

Not all cancers that start in the kidneys are the same. Different types of kidney cancer can act differently and might need different treatments.

Renal cell carcinoma

Renal cell carcinoma (RCC), also known as renal cell cancer, is the most common type of kidney cancer. About 9 out of 10 kidney cancers are renal cell carcinomas. If you're told you have kidney cancer, it's most likely to be a renal cell carcinoma.

Although RCC usually grows as a single tumor within a kidney, sometimes a person can have more than one tumor in a kidney or even tumors in both kidneys at the same time.

There are several subtypes of RCC. Knowing the subtype of RCC can help decide on treatment and can also help your doctor figure out if your cancer might be caused by an inherited genetic syndrome. See [Risk Factors for Kidney Cancer⁴](#) for more information about inherited kidney cancer syndromes.

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 start in the lining of the renal pelvis (where the ureters meet the kidneys). This lining is made up of cells called **transitional cells**, which are the same cells that line the ureters and bladder. Cancers that develop from these cells look like other urothelial carcinomas, such as bladder cancer, when looked at closely. 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 carcinoma. Like bladder cancer, when transitional cells

Angiomyolipomas are the most common type of benign kidney tumor. They are seen more often in women. They can develop sporadically or in people with tuberous sclerosis, a genetic condition that also affects the heart, eyes, brain, lungs, and skin.

Gupta S, Richie JP. Malignancies of the renal pelvis and ureter. UpToDate. 2023. Accessed at <https://www.uptodate.com/contents/malignancies-of-the-renal-pelvis-and-ureter> on December 5, 2023.

Kay FU, Pedrosa I. Imaging of solid renal masses. *Urol Clin North Am*. 2018; 45:311-330. doi: 10.1016/j.ucl.2018.03.013. Epub 2018 Jun 15.

McNamara MA, Zhang T, Harrison MR, George DJ. Ch 79: Cancer of the kidney. In: Niederhuber JE, Armitage JO, Doroshow JH, Kastan MB, Tepper JE, eds. *Abeloff's Clinical Oncology*. 6th ed. Philadelphia, Pa: Elsevier: 2020.

Torres VE, Pei Y. Renal angiomyolipomas (AMLs): Epidemiology, pathogenesis, clinical manifestations, and diagnosis. UpToDate. 2023. Accessed at <https://www.uptodate.com/contents/renal-angiomyolipomas-amls-epidemiology-pathogenesis-clinical-manifestations-and-diagnosis> on December 5, 2023.

Last Revised: May 1, 2024

Key Statistics About Kidney Cancer

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 65, with most people being diagnosed between ages 55 and 74. Kidney cancer is uncommon in people younger than age 45.

Kidney cancer is about twice as common in men than in women, and it is more common in African American, American Indian, and Alaska Native people.

Lifetime risk of kidney cancer

Overall, the lifetime risk for developing kidney cancer in men is about 1 in 43 (2.3%). The lifetime risk for women is about 1 in 73 (1.4%). But each person's risk can be affected by a number of factors, which are described in [Risk Factors for Kidney Cancer](#).¹

Trends in new cases and death rates

The rate of new kidney cancers found each year has been rising for many years. Part of this rise probably has been due to the use of newer imaging tests such as CT scans, which have picked up some cancers that might never have been found otherwise.

On the other hand, death rates for kidney cancer have been falling for many years.

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

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

Hyperlinks

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

References

American Cancer Society. *Cancer Facts & Figures 2024*. Atlanta, Ga: American Cancer Society; 2024.

McNamara MA, Zhang T, Harrison MR, George DJ. Ch 79 - Cancer of the kidney. In: Niederhuber JE, Armitage JO, Doroshow JH, Kastan MB, Tepper JE, eds. *Abeloff's Clinical Oncology*. 6th ed. Philadelphia, Pa: Elsevier: 2020.

National Cancer Institute. Cancer Stat Facts: Kidney and Renal Pelvis Cancer. 2023. Accessed at <https://seer.cancer.gov/statfacts/html/kidrp.html> on December 5, 2023.

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What's New in Kidney Cancer Research?

Research into the causes, detection, diagnosis, and treatment of kidney cancer (renal cell carcinoma, or RCC) is being done at many medical centers, university hospitals, and other institutions around the world. A few examples of these are discussed here.

- [Genetics of kidney cancer](#)
- [Local forms of treatment](#)
- [Treatment options for advanced non-clear cell renal cell carcinoma](#)
- [Targeted therapy and immunotherapy](#)
- [Tests and other factors to help determine treatment options](#)

Genetics of kidney cancer

Researchers are learning more about the gene changes inside kidney cells that cause them to become cancer cells. Knowing about these changes has helped doctors better classify kidney cancers into different types, which can sometimes affect treatment choices. This information has also helped researchers develop newer drugs that specifically target some of these changes inside the cancer cells (see below).

Local forms of treatment

Many kidney cancers can be treated by removing or destroying the tumor(s). Treatments such as surgery, ablative treatments, and radiation therapy can be helpful in different situations. Doctors are developing newer approaches to these treatments. For example:

[Surgery to remove kidney cancer](#)¹ can now often be done using robotic-assisted laparoscopic surgery, in which the surgeon sits at a panel in the operating room and controls very precise robotic arms to do the surgery.

Newer types of [ablative treatments](#)², such as microwave ablation and irreversible electroporation, are now being studied for use in destroying tumors in the kidneys or other parts of the body.

Newer forms of [radiation therapy](#)³, such as stereotactic body radiation therapy (SBRT), are now an option to treat some tumors.

Treatment options for advanced non-clear cell renal cell carcinoma

The most common type of kidney cancer is **clear cell RCC**. A small portion of kidney cancers, called **non-clear cell RCCs**, are different subtypes, which might respond better to different types of treatment than those used for clear cell RCC. Doctors are now studying which treatments might be most helpful for these cancers.

Targeted therapy and immunotherapy

In the last couple of decades, newer types of drug treatments have emerged as the most effective treatment options for most advanced kidney cancers.

[Targeted drugs](#)⁴ attack specific parts of cancer cells (or nearby cells that help them grow, such as the cells that make new tumor blood vessels).

[Immunotherapy drugs](#)⁵ help the body's own immune system find and attack the cancer cells.

These types of drugs, alone or combined, are now usually the main treatment options for kidney cancers that can't be removed completely with surgery. Doctors are now studying which combinations of drugs might work best.

Newer types of targeted and immunotherapy drugs are being developed. For example,

CAR T-cells are a person's own immune cells that have been altered in a lab to attack a target on cancer cells. Researchers are now looking to see if CAR T-cells designed to attach to the CD70 protein on cancer cells can be helpful in treating advanced RCC.

Adjuvant therapy

Doctors are studying if giving additional (adjuvant) treatment after surgery can help lower the risk of kidney cancer coming back, especially when there's a higher risk this might happen. For example, getting the immunotherapy drug pembrolizumab (Keytruda) for about a year has been shown to help lower this risk in some people, especially those with clear cell RCC. Other medicines are being studied as well to see if they can lower this risk.

Neoadjuvant therapy

Doctors are also studying giving drug treatments such as immunotherapy or targeted therapy

Hyperlinks

1. www.cancer.org/cancer/types/kidney-cancer/treating/surgery.html
2. www.cancer.org/cancer/types/kidney-cancer/treating/ablation.html
3. www.cancer.org/cancer/types/kidney-cancer/treating/radiation.html
4. www.cancer.org/cancer/types/kidney-cancer/treating/targeted-therapy.html
5. www.cancer.org/cancer/types/kidney-cancer/treating/immunotherapy.html

References

Atkins MB. Overview of the treatment of renal cell carcinoma. UpToDate. 2023. Accessed at <https://www.uptodate.com/contents/overview-of-the-treatment-of-renal-cell-carcinoma> on December 13, 2023.

Choueiri TK, Pal SK. The treatment of advanced non-clear cell renal carcinoma. UpToDate. 2023. Accessed at <https://www.uptodate.com/contents/the-treatment-of-advanced-non-clear-cell-renal-carcinoma> on December 15, 2023.

Graham J, Heng DC, Brugarolas J, Vaishampayan U. Personalized management of advanced kidney Cancer.

cancer care as well as editors and translators with extensive experience in medical writing.

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