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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?](#)
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What Is Kidney Cancer?

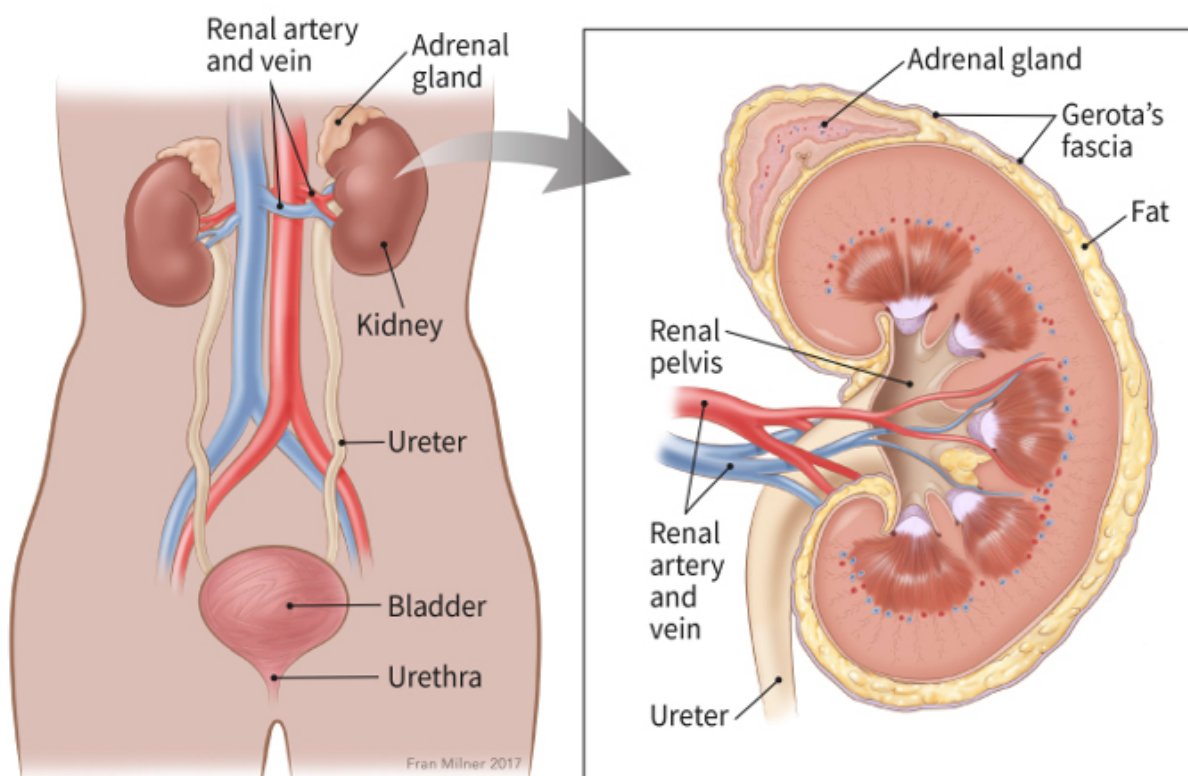
Kidney cancer is a type of cancer that starts in the kidney. Cancer starts when cells in the body begin to grow out of control. To learn more about how cancers start and spread, see [What Is Cancer?](#)¹

To understand kidney cancer, it helps to know about the normal structure and function of the kidneys.

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 protected by the lower rib cage. One kidney is just to the left and the other just to the right of the backbone. The upper and lower portions of each kidney are sometimes called the *superior pole* and *inferior pole*.

A small organ called an adrenal gland sits on top of each kidney. 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 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 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 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 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 in the lab. Knowing the subtype of RCC can be a factor in deciding treatment and can also help your doctor determine if your cancer might be caused by an inherited genetic syndrome. See [Risk Factors for Kidney Cancer²](#) 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 in the lab, the cells that make up clear cell RCC look very pale or clear.

Non-clear cell renal cell carcinomas

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 when looked at 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 very closely.

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 cancer 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, when looked at closely in the lab. 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-cancer). 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 or radiofrequency ablation. 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.

Angiomyolipoma: Angiomyolipomas are the most common 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.

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.

Oncocytoma: Oncocytomas are benign kidney tumors that are not common and can sometimes grow quite large. They are seen more often in men and do not normally spread to other organs, so surgery often cures them.

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/treatment/understanding-your-diagnosis/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

References

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Last Revised: May 5, 2020

Key Statistics About Kidney Cancer

How common is kidney cancer?

The American Cancer Society's most recent estimates for kidney cancer in the United States for 2022 are:

- About 79,000 new cases of kidney cancer (50,290 in men and 28,710 in women) will be diagnosed.
- About 13,920 people (8,960 men and 4,960 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 with most people being diagnosed between ages 65 and 74. Kidney cancer is very 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 Americans and American Indian /Alaska Natives.

Lifetime risk of kidney cancer

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 46 (2.02%). The lifetime risk for women is about 1 in 80 (1.03%). A number of factors (described in [Risk Factors for Kidney Cancer](#)¹) also affect a person's risk.

New cases and death rates

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

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American Cancer Society. *Cancer Facts & Figures 2022*. Atlanta, Ga: American Cancer Society; 2022.

Howlader N, Noone AM, Krapcho M, Miller D, Brest A, Yu M, Ruhl J, Tatalovich Z, Mariotto A, Lewis DR, Chen HS, Feuer EJ, Cronin KA (eds). SEER Cancer Statistics Review, 1975-2016, National Cancer Institute. Bethesda, MD, https://seer.cancer.gov/csr/1975_2016/, based on November 2018 SEER data

submission, posted to the SEER web site, April 2019.

Lifetime Risk (Percent) of Being Diagnosed with Cancer by Site and Race/Ethnicity:

Males, 21 SEER Areas, 2014-2016 (Table 1.15)

https://seer.cancer.gov/csr/1975_2016/results_merged/topic_lifetime_risk.pdf. Accessed January 24, 2020.

Females, 21 SEER Areas, 2014-2016 (Table 1.16)

https://seer.cancer.gov/csr/1975_2016/results_merged/topic_lifetime_risk.pdf
Accessed January 24, 2020.

Last Revised: January 12, 2022

What's New in Kidney Cancer Research?

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

Treatment options for non-clear cell renal cell carcinoma

The most common type of renal cell carcinoma (RCC) is called clear cell. About 20% are different subtypes and called non-clear cell RCCs. Initial studies seem to show that they do not respond as well to targeted therapy drugs and appear to have poorer outcomes. More research is being done to find out how each subtype of non-clear cell RCC behaves in the hope this information will help guide better treatments for this type of kidney cancer.

Targeted therapy and immunotherapy

Because chemotherapy is not very effective against advanced kidney cancer, immune therapy drugs combinations, combinations of immune therapies with targeted therapies, and [targeted therapies](#)⁵ are now usually the first-line option to treat kidney cancers that

cannot be removed by surgery or have spread outside the kidney. More research is being done to see which people with kidney cancer will benefit most from targeted therapy, immunotherapy or combinations.

Neoadjuvant therapy

Giving targeted drugs before surgery (called **neoadjuvant therapy**) is also being studied to see if it will shrink large, bulky 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

Giving targeted drugs after surgery (called **adjuvant therapy**) is also being studied to reduce the chances of the cancer coming back in patients at high risk of recurrence. To date, sunitinib (Sutent) is the only targeted drug approved for this, but it does not appear to help people live longer.

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 response to treatment

A common side effect of targeted therapy is high blood pressure. One study has shown that people who developed high blood pressure while taking sunitinib responded better to the treatment than those whose blood pressure remained normal. More research is being done to try to find out what other factors seen during targeted therapy treatment might help predict whose cancer is responding or not responding so adjustments can be made if needed.

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/treating/targeted-therapy.html

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Last Revised: February 1, 2020

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