KIDNEY CANCER
A GUIDE FOR PATIENTS AND THEIR FAMILIES
If you are worried about your kidney cancer risk, or you or your loved one has been diagnosed with kidney cancer, finding reliable information can be difficult and overwhelming. Fox Chase Cancer Center’s kidney cancer team developed this guide to make it easier for individuals to understand this disease and its various treatment options.

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WHAT IS KIDNEY CANCER?

The kidneys are two bean-shaped organs located just below the rib cage, one on each side of the spine (above the waist). They clean the blood to remove waste and produce urine. They also make hormones that help control blood pressure and signal the bone marrow to make red blood cells when needed.

There are different types of kidney cancer:
- Renal cell carcinoma, which is most common in adults and accounts for more than 90 percent of all kidney tumors
- Wilms’ tumor, which primarily occurs in children
- Transitional cell cancer, also called urothelial cancer, which forms in the ureter (the tube that carries urine from the kidney to the bladder) and renal pelvis (where the ureter meets the kidney—this type of cancer is similar to bladder cancer because both originate from the same kind of cells)
- Renal sarcoma, a rare type of kidney cancer (< 1% of cases) arising from the connective tissue

Almost all kidney cancers start in the lining of tiny tubes called tubules, and most kidney cancers are usually found before they spread. However, if left undetected, kidney tumors can grow and spread to other organs (becoming metastatic kidney cancer).

Symptoms
Possible signs and symptoms of kidney cancer include:
- Blood in the urine
- Lower back pain on one side
- A mass or lump on the side or lower back
- Fatigue
- Loss of appetite
- Weight loss not caused by dieting
- Persistent fever unrelated to an infection
- Anemia (low red blood cell count)

While kidney and other types of cancer can cause these symptoms, in most cases they are caused by a noncancerous (benign) condition or disease. It is recommended that individuals with one or more of the symptoms listed above seek medical care to determine their cause and receive treatment if needed.

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Kidney cancer is approximately twice as likely to affect men than women. This may be because men are more likely to be smokers and more likely to be exposed to cancer-causing chemicals at work.

Also, while the reasons are unclear, the African American and Native American/Alaska Native communities have slightly higher rates of kidney cancer than the Caucasian community.

Having one or many of these risk factors does not mean an individual will develop kidney cancer, and conversely, some people with kidney cancer have no risk factors at all. All risk factors are considered when a doctor assesses a patient’s kidney cancer risk.

**Risk Assessment for Hereditary Kidney Cancer**

About 5–8 percent of kidney cancer cases are due to an inherited gene change. Some clues of an inherited kidney cancer pattern are:

- Two or more family members with kidney cancer
- Bilateral tumors (tumors in both kidneys) or multifocal tumors (multiple tumors in one or both kidneys)
- Various noncancerous skin findings in addition to kidney cancer, including fibrofolliculomas, cutaneous leiomyomas, angiofibromas or skin tags
- A family history of kidney cancer along with a personal history of uterine fibroids or tumors of the brain, pancreas, heart, eye, inner ear, adrenal gland or parathyroid gland
- A history of kidney cancer and pneumothorax (collapsed lung) or pulmonary cysts in the family

For people at risk of developing hereditary kidney cancer, Fox Chase’s Risk Assessment Program within the Department of Clinical Genetics offers genetic counseling and options for genetic testing.

The program also offers high-risk screening consultation, which provides cancer risk management for patients with hereditary kidney cancer or certain kidney cancer syndromes.

For more information, visit [Kidney Cancer: A Guide for Patients and Their Families](#).

**TO SCHEDULE AN APPOINTMENT WITH THE RISK ASSESSMENT TEAM, PLEASE CALL 877-627-9684.**

*Fox Chase Cancer Center’s genetic counselor Catherine Neumann meets with individuals to discuss their kidney cancer risk.*

There are also potential research studies open to patients within the Risk Assessment Program. By studying the biological, genetic, and environmental factors that influence cancer risk, our researchers are working to understand the hereditary factors that influence cancer, who is at risk for certain types of cancer, and how we might lower this risk.

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DIAGNOSING KIDNEY CANCER

Doctors can identify and diagnose kidney cancer tumors using imaging tests and, if needed, biopsy procedures. Imaging studies are also used to determine whether a tumor is localized to the kidney or if it has spread beyond the kidney to other parts of the body (metastasized). Approximately 15–20 percent of kidney masses are not cancerous. These masses (also called lesions) include:

- Simple or complex cysts
- Oncocytomas
- Angiomyolipomas
- Renal adenomas

Experienced radiologists can often review a patient’s imaging study (a CAT scan or MRI) and determine whether a tumor is a benign lesion, thus saving the patient from unnecessary treatment.

If imaging suggests kidney cancer, further diagnostic testing may include:

- **Pyelogram:** A rarely used endoscopic procedure that uses X-rays and a dye to look inside the kidneys and ureters (the tubes that carry urine from the kidneys to the bladder)
- **Ureteroscopy:** A minimally invasive procedure that uses a scope to examine the ureter
- **Cystoscopy:** A procedure that uses a scope to look directly inside the bladder and urethra for tumors or abnormal growths

Once a tumor has been located, a tissue sample may be taken in a needle biopsy procedure to diagnose and stage the kidney cancer. The procedure may be guided by imaging (radiographic) technology, such as ultrasound or computed tomography (CT).

A urologist may recommend surgery without a biopsy if the lesion appears to have a high chance of being cancerous.

**Staging**

Using kidney tissue samples together with imaging, pathologists can diagnose the type and urologists or oncologists can diagnose the stage of an individual’s kidney cancer to determine whether their disease is invasive or noninvasive (and whether additional therapy is required). Kidney cancer is categorized into four different stages. Each stage indicates tumor size and how far the disease has spread:

- **Stage I or II (Stage T1 or T2):** In these stages, the tumor is 4 to 7 cm (Stage I) or 7 to 10 cm across or larger (Stage II) and is clinically localized (meaning the cancer hasn’t spread beyond the kidney). About 70–75 percent of kidney cancer patients have Stage I or Stage II disease
- **Stage III (Stage T3):** At this stage, the tumor is growing into a major vein leading out of the kidney or is present in the tissue surrounding the kidney. However, it has not spread to the adrenal gland (located on top of the kidney) or outside the fibrous layer that surrounds the kidney (called Gerota’s fascia) and nearby fatty tissue
- **Stage IV (Stage T4 or M1):** In this stage, the disease has spread beyond Gerota’s fascia locally, has grown into the adrenal gland, or has spread to distant places in the body like the lymph nodes, lungs, bone or liver. This process is called metastasis, and new cancer growths are called metastases or metastatic tumors.

**Survival Predictors**

For patients with localized kidney cancer, certain pathologic factors (as well as patient performance status) can help doctors predict the chance of cancer returning. These factors include:

- The size of the tumor
- Tumor grade (how it looks under a microscope)
- Whether it has invaded the renal vein

In stage IV kidney cancer, physicians assess additional factors to determine prognosis (the expected course and outcome of an illness).

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The following factors have been linked to shorter survival time for individuals with metastatic kidney cancer:

- High blood calcium level
- Anemia (low red blood cell count)
- High platelet count
- High neutrophil (a type of white blood cell) count
- Needing systemic treatment less than a year after diagnosis
- Poor performance status, which is a measure of how well a person can do normal daily activities

People who have none of the factors listed above have a good prognosis. Individuals with one or two of the factors have an intermediate prognosis, and those with three or more factors have a poor prognosis and may be more or less likely to benefit from certain treatments.

While this information can be useful, it is important to remember that various factors affect an individual's prognosis, and survival rates vary. For relevant information about their own disease and prognosis, individuals should have a discussion with their physician.

**TREATMENT OPTIONS**

There are various treatment options available for kidney cancer, and an individual’s care team will develop their personalized treatment plan based on the following factors:

- The stage, type, and grade of their tumor
- Whether their tumor has spread to other organs
- Their age, health history, and personal treatment goals

**Active Surveillance**

Some patients may benefit from having their disease monitored instead of immediately starting treatment. In these cases, treatment isn’t recommended unless a small tumor grows larger over time.

This active surveillance approach uses data-proven risk management techniques to assess if or when an individual needs treatment, and it may be an option for patients with kidney tumors that are smaller than 4 cm in size and have not spread past the kidney. It is also a good option for elderly or frail patients who may face significant risks if they undergo treatment.

Fox Chase physicians are thought leaders in the field of active surveillance for small kidney tumors and have developed detailed protocols for kidney cancer risk assessment. Our urologic oncology team’s extensive background gives our patients the option to avoid active treatment when appropriate.

**Treatment for Localized Disease**

When kidney cancer is confined to a small area of the kidney, localized therapies (such as surgery or ablation) focus solely on that particular area. This spares healthy tissue and surrounding organs from damage.

If cancerous cells have spread to other parts of the body, the following localized approaches may be combined with systemic treatments:

**SURGERY**

If possible, surgical removal of a kidney tumor is considered the best treatment option.

Traditionally, kidney cancer surgery was only done using open techniques (which required large incisions) and typically involved full removal of the affected kidney, nearby adrenal glands, and/or surrounding tissue.

Recently, however, various techniques have been developed that allow patients to keep healthy sections of their diseased kidney and experience fewer surgical side effects and shorter recovery time. These techniques include:

- **Partial nephrectomy (also called kidney sparing or kidney preserving surgery):** This procedure involves the removal of a kidney tumor while preserving as much healthy kidney tissue as possible. This helps maintain kidney function and decreases the risk of kidney failure and dialysis later on. Research performed at Fox Chase and confirmed at other leading national medical centers indicates that partial nephrectomies can achieve clinical results similar to those involving total kidney removal. Kidney preservation is particularly important for patients with certain complications or chronic conditions, including diabetes, hypertension, or coronary disease. Preserving healthy parts of a kidney is also beneficial for healthy patients who may develop kidney-impacting diseases as they get older.

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Fox Chase's urologic oncologists are the region's leaders in partial nephrectomy. In 2009, they developed a standardized system to determine if a patient qualifies for a partial nephrectomy, basing the decision on the tumor’s location, size, and other characteristics. This tool (R.E.N.A.L. nephrometry score) is used widely by kidney surgeons across the globe.

- **Minimally invasive (laparoscopic and robotic) surgery:** When appropriate, minimally invasive surgical techniques are used for the removal of kidney tumors. These approaches allow for decreased blood loss, smaller incisions and quicker recovery than traditional open surgical techniques.

Robotic and laparoscopic surgeries are performed either through a traditional transperitoneal (through the front) approach or through a more technically challenging retroperitoneal (through the side) robotic technique.

Fox Chase was the first in its region and among the earliest in the nation to perform laparoscopic kidney surgery. Today, between 80 and 90 percent of kidney surgeries at Fox Chase are done using a minimally invasive technique.

**Ablation**

Ablation may be selected as a treatment option for frail or elderly patients who cannot undergo a surgical procedure. There are two types of ablation:

- **Radiofrequency ablation (also called radioablation):** During this treatment, doctors insert a special needle (probe) into the tumor and use high-energy radio waves to heat and destroy it.

- **Renal cryotherapy:** This treatment involves the insertion of probes into the tumor tissue to freeze and thaw it. This process destroys cancerous cells.

Both radiofrequency ablation and renal cryotherapy treatment may be guided by imaging technology (such as ultrasound, CT/CAT scans or MRI scans).

**Radiation Therapy**

Radiation therapy is rarely used as a primary localized treatment for kidney cancer because it is not as effective as surgery. However, external beam radiation therapy can be used to relieve pain or other symptoms in patients with advanced kidney cancer, especially if it has spread to the bones. This type of treatment is called palliative treatment, and it is used to improve quality of life.
Systemic Treatment for Metastatic Disease

Systemic therapy may be given before or after localized therapy. It may also be recommended to patients who are diagnosed after their cancer has metastasized.

A medical oncologist will determine an individual’s personalized systemic therapy plan, which may include a standard-of-care therapy or one that is part of a clinical trial.

TARGETED DRUG THERAPIES

Targeted therapy drugs are designed to control cancer and reduce or prevent cancer-related symptoms.

Some examples of targeted therapy drugs are:

- Sunitinib
- Pazopanib
- Axitinib
- Cabozantinib
- Pazopanib
- Lenvatinib
- Everolimus

Most of these drugs are protein kinase inhibitors, which interfere with the growth and spread of kidney cancer by stopping blood vessel formation and formation of other pathways that cancer cells use to grow and spread. These drugs are used to reduce the size of kidney tumors so that they can be surgically removed or, in rare cases, they are used after surgery to prevent recurrence.

IMMUNOTHERAPY

Immunotherapy stimulates an individual’s own immune system to fight cancer.

Kidney cancer sometimes has a surprising (but favorable) outcome of spontaneous regression. Doctors have found that in some cases, if the patient’s immune system is activated, metastatic tumors subsequently and unpredictably regress and disappear following surgery without any other intervention.

Over the last five years, many new immunotherapy drugs have been approved for metastatic renal cell carcinoma. Nivolumab (brand name Opdivo®) was approved by the Food and Drug Administration (FDA) in 2015 to treat certain patients with metastatic renal cell carcinoma. It works by targeting and blocking the cellular pathway known as PD-1/PD-L1—proteins that keep the body’s immune cells from killing other cells (including cancer cells). By blocking this pathway, nivolumab may help the body’s immune system fight cancer cells. For some patients, it can also be combined with another immunotherapy drug (called ipilimumab) for first-line treatment. Other immunotherapy drugs (such as pembrolizumab, brand name KEYTRUDA®) are combined with targeted therapies (including axitinib) to treat kidney cancer.

Systemic therapy options for kidney cancer are always evolving, mainly due to advancements made from clinical trials and research. It is strongly advised that individuals discuss all available options with their medical oncologists before selecting their treatment.

In addition to offering patients the latest systemic therapies for advanced kidney cancer, Fox Chase is also actively developing and evaluating a number of new therapies, often before they are available anywhere else. These therapies include immunotherapy and targeted therapies that interfere with cancer’s ability to spread. Fox Chase’s clinical researchers were instrumental in gaining FDA approval for the combination of axitinib and pembrolizumab, which is an effective treatment for some kidney cancer patients with advanced renal cell carcinoma.

Dr. Matthew Zibelman is a medical oncologist who specializes in the treatment of kidney and other genitourinary cancers. Along with providing the latest standard-of-care treatments to patients, he also offers a wide variety of clinical trial options for kidney cancer treatment.

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CLINICAL TRIALS

Clinical trials provide patients access to new procedures that aren’t yet widely available or to drugs and medical devices before they are approved by the FDA. A clinical trial may also be used to test ideas about diagnosing cancer, preventing cancer, or managing symptoms and side effects. Participating patients agree to let researchers use data on their responses and outcomes (without their name attached) for research purposes. These programs are carefully developed and approved by regulatory bodies to minimize any risks or discomfort.

The cancer treatments used today are products of previous clinical trials, and the trials taking place now will help determine how we approach cancer in the future. Cancer care can only advance with the participation of patients, so if you or someone you love is interested in these opportunities, please ask about them. It’s up to each individual whether they wish to participate, and their doctor will provide them with all the information needed to make an informed decision. Individuals are welcome to review this information with their loved ones or other medical professionals.

Fox Chase Cancer Center actively participates in a number of clinical trials for individuals with kidney cancer. Our patients benefit from the groundbreaking research that we do to expand the scientific community’s understanding of kidney cancer therapies and treatments.

To learn more about current clinical trials, individuals should talk to their doctor about whether they are eligible to participate in such research.

KIDNEY CANCER SUPPORT SERVICES

Cancer care can affect various aspects of an individual’s life.

At Fox Chase, we offer a variety of support services for kidney cancer patients and their loved ones, including:

- Integrative Care
- Nurse Navigation
- Nutrition Support and Counseling
- Pain and Palliative Care
- Pastoral Care
- Physical Medicine and Rehabilitation
- Social Work
- Stress Management

To learn more about our support services, visit our website.

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WHY CHOOSE FOX CHASE?

Fox Chase Cancer Center’s multidisciplinary team is the region’s leader in kidney cancer care. Over the last three decades, we have been at the forefront of pioneering innovative techniques and treatments that have set new standards for care excellence and have advanced the medical community’s overall knowledge of kidney cancer prevention, diagnosis and treatment.

That’s because our physicians are not just clinical specialists—they are world-renowned cancer researchers as well, sharing their discoveries with the international medical community through peer-reviewed journals, conferences and education.

A Personalized Approach

Each patient’s kidney cancer diagnosis and circumstances are unique, offering many options for how and when to treat each individual’s disease.

Our multidisciplinary team of surgical, medical, and radiation oncologists works together to coordinate care and deliver the best possible clinical outcome for each patient.

We also offer patients the newest and most cutting-edge clinical trials, and our research has led to FDA approval of drugs and drug combinations as well as established care standards around the country.

In summary, Fox Chase Cancer Center:

- Has the highest designation from the National Cancer Institute (NCI) as a Comprehensive Cancer Center, an elite center recognized for excellence in cancer treatment, research, prevention and education
- Offers patients a multidisciplinary kidney cancer care team consisting of leaders in the genitourinary cancer field
- Provides the full spectrum of care for kidney cancer—from detection through survivorship
- Has significant experience with open, endoscopic, laparoscopic, and robotic surgery
- Offers access to clinical trials for emerging and innovative therapies for kidney cancer

LEARN MORE

We hope that you’ve found this guide to be a useful resource. If you have further questions about kidney cancer, please contact the Fox Chase team at 888-427-9456.