Kidney cancer is a growth of cells that starts in the kidneys. The kidneys are two bean-shaped organs, each about the size of a fist. They're located behind the abdominal organs, with one kidney on each side of the spine.

In adults, renal cell carcinoma is the most common type of kidney Tumor. Other, less common types of kidney Tumor can happen. Young children are more likely to develop a kind of kidney Tumor called Wilms tumor.

The number of kidney Tumors diagnosed each year seems to be increasing. One reason for this may be the fact that imaging techniques such as CT scans are being used more often. These tests may lead to the incidental discovery of more kidney Tumors. Kidney Tumor is often found when the cancer is small and confined to the kidney.

Kidney cancer doesn't usually cause symptoms at first. In time, signs and symptoms may develop, including:

Blood in the urine, which may appear pink, red or cola colored.
Loss of appetite.
Pain in the side or back that doesn't go away.
Tiredness.
Unexplained weight loss.

Kidney cancer happens when cells in the kidney develop changes in their DNA. A cell's DNA holds the instructions that tell the cell what to do. In healthy cells, the DNA gives instructions to grow and multiply at a set rate. The instructions tell the cells to die at a set time. In cancer cells, the DNA changes give different instructions. The changes tell the cancer cells to make many more cells quickly. Cancer cells can keep living when healthy cells would die. This causes too many cells.

The cancer cells form a mass called a tumor. The tumor can grow to invade and destroy healthy body tissue. In time, cancer cells can break away and spread to other parts of the body. When cancer spreads, it's called metastatic cancer.

Risk factors
Factors that may increase the risk of kidney Tumor include:

Older age. The risk of kidney Tumor increases with age.
Smoking tobacco. People who smoke have a greater risk of kidney Tumor than those who don't. The risk decreases after quitting.
Obesity. People who are obese have a higher risk of kidney Tumor than people who are considered to have a healthy weight.
High blood pressure. High blood pressure, also called hypertension, increases the risk of kidney Tumor.
Certain inherited conditions. People who are born with certain inherited conditions may have an increased risk of kidney Tumor. These conditions may include von Hippel-Lindau disease, Birt-Hogg-Dube syndrome, tuberous sclerosis complex, hereditary papillary renal cell carcinoma and familial renal cancer.

Family history ofKidney Tumor. The risk of kidney Tumor is higher if a blood relative, such as a parent or sibling, has had the disease.
Prevention
There's no sure way to prevent kidney tumors, but you may reduce your risk if you:

Drink alcohol in moderation, if at all
If you choose to drink alcohol, do so in moderation. For healthy adults, that means up to one drink a day for women and up to two drinks a day for men.

Eat more fruits and vegetables
Choose a healthy diet with a variety of fruits and vegetables. Food sources of vitamins and nutrients are best. Avoid taking large doses of vitamins in pill form, as they may be harmful.

Exercise most days of the week
Aim for at least 30 minutes of exercise on most days of the week. If you haven't been active lately, ask your healthcare professional whether it's OK and start slowly.

Maintain a healthy weight
If your weight is healthy, work to maintain that weight. If you need to lose weight, ask a healthcare professional about healthy ways to lower your weight. Eat fewer calories and slowly increase the amount of exercise.

Stop smoking
Talk with your healthcare team about strategies and aids that can help you quit. Options include nicotine replacement products, medicines and support groups. If you've never smoked, don't start.

Control high blood pressure
Ask your healthcare professional to check your blood pressure at your next appointment. If your blood pressure is high, you can discuss options for lowering your numbers. Lifestyle measures such as exercise, weight loss and diet changes can help. Some people may need to add medicines to lower their blood pressure. Discuss your options with your healthcare team.

Kidney stones are hard objects made of minerals and salts in urine. They form inside the kidneys. You may hear healthcare professionals refer to kidney stones as renal calculi, nephrolithiasis or urolithiasis.

Kidney stones have various causes. These include diet, extra body weight, some health conditions, and some supplements and medicines. Kidney stones can affect any of the organs that make urine or remove it from the body — from the kidneys to the bladder. Often, stones form when the urine has less water in it. This lets minerals form crystals and stick together.

Passing kidney stones can be quite painful. But prompt treatment usually helps prevent any lasting damage. Sometimes, the only treatment needed to pass a kidney stone is taking pain

medicine and drinking lots of water. Other times, surgery or other treatments may be needed. It depends on size, location and the type of stone you have.

If you've had more than one kidney stone, your healthcare professional can show you ways to prevent more. This may involve making diet changes, taking medicine or both.

A kidney stone usually doesn't cause symptoms until it moves around within the kidney or passes into one of the ureters. The ureters are the tubes that connect the kidneys and bladder.

If a kidney stone gets stuck in one of the ureters, it may block the flow of urine and cause the kidney to swell and the ureter to spasm. That can be very painful. At that point, you may have these symptoms:

Serious, sharp pain in the side and back, below the ribs.
Pain that spreads to the lower stomach area and groin.
Pain that comes in waves and varies in how intense it feels.
Pain or a burning feeling while urinating.
Other symptoms may include:

Pink, red or brown urine.
Cloudy or foul-smelling urine.
A constant need to urinate, urinating more often than usual or urinating in small amounts.
Upset stomach and vomiting.
Fever and chills if an infection is present.
Pain caused by a kidney stone may change as the stone moves through your urinary tract. For instance, the pain may shift to a different part of the body or become more intense.

Get a healthcare checkup right away if you have:

Pain so bad that you can't sit still or find a comfortable position.
Pain along with upset stomach and vomiting.
Pain along with fever and chills.
Blood in your urine.
Trouble passing urine.

Kidney stones develop when the urine contains more crystal-forming substances than the fluid in the urine can dilute. These substances include calcium oxalate, calcium phosphate and uric acid. At the same time, the urine may lack substances that prevent crystals from sticking together. That creates an ideal setting for kidney stones to form.

Types of kidney stones
Knowing the type of kidney stone you have helps your healthcare professional figure out its cause and the right treatment for you. This information also can give clues on how to prevent more kidney stones. If you can, try to save your kidney stone if you pass one. Then bring it to your healthcare professional, who can check on what type of kidney stone it is.

Types of kidney stones include:

Calcium stones. Most kidney stones are calcium stones. They're usually made of the chemical compound calcium oxalate. Oxalate is a substance made daily by the liver or absorbed from diet. Some fruits and vegetables, as well as nuts and chocolate, have high amounts of oxalate.

Dietary factors, high doses of vitamin D, intestinal bypass surgery and many conditions that affect metabolism can make calcium or oxalate more concentrated in urine.

Calcium stones also can be made of calcium phosphate. This type of stone is more common in metabolic conditions such as renal tubular acidosis. It also may be linked with some medicines for migraines or seizures such as topiramate (Topamax, Trokendi XR, others).

Uric acid stones. Uric acid stones can form in people who lose too much fluid because of ongoing diarrhea or people who have trouble absorbing nutrients from food; those who eat a high-protein diet or lots of organ meats or shellfish; and those with diabetes mellitus or metabolic syndrome. Some genetic factors also may raise the risk of uric acid stones.
Struvite stones. Struvite stones form in response to a urinary tract infection. These stones can grow quickly and become quite large, sometimes with few symptoms or little warning.
Cystine stones. These stones form in people with a rare genetic condition called cystinuria that causes the kidneys to leak too much of a protein building block called cystine.
Risk factors
Factors that raise your risk of kidney stones include:

Family or personal history. If someone in your family has had kidney stones, you're more likely to develop stones too. If you've already had one or more kidney stones, you're at higher risk of getting another.
Dehydration. Not drinking enough water each day can raise your risk of kidney stones. People who live in warm, dry climates and those who sweat a lot may be at higher risk than others.
Some diets. Eating a diet that's high in oxalate, protein, sodium and sugar may raise your risk of some types of kidney stones. This is especially true with a high-sodium diet. Too much sodium raises the amount of calcium the kidneys must filter. And that greatly raises the risk of kidney stones.
Obesity. This complex disease involves having too much body fat, and it's been linked with a higher risk of kidney stones.
Digestive diseases and surgery. Gastric bypass surgery, inflammatory bowel disease or ongoing diarrhea can cause changes in the digestive process. These changes affect how the body absorbs calcium and water. That in turn increases the amounts of stone-forming substances in the urine.
Other health conditions such as renal tubular acidosis, cystinuria, hyperparathyroidism and repeated urinary tract infections also can raise the risk of kidney stones. A rare genetic condition called primary hyperoxaluria raises the risk of calcium oxalate stones.
Some supplements and medicines. These include vitamin C, dietary supplements, overuse of laxatives, calcium-based antacids, and some medicines for migraines or depression.
Prevention
Prevention of kidney stones may include a mix of lifestyle changes and medicines.

Lifestyle changes
You may lower your risk of kidney stones if you:

Drink water throughout the day. This is the most important lifestyle change you can make. If you've had kidney stones before, your healthcare professional may tell you to drink enough fluids to pass about 2.1 quarts (2 liters) of urine a day or more. You may be asked to measure how much urine you pass to make sure that you're drinking enough water.

If you live in a hot, dry climate or you exercise often, you may need to drink even more water to produce enough urine. If your urine is light and clear, you're likely drinking enough water.

Eat fewer oxalate-rich foods. If you tend to form calcium oxalate stones, your healthcare professional may recommend limiting foods rich in oxalates. These include rhubarb, beets, okra, spinach, Swiss chard, sweet potatoes, nuts, tea, chocolate, black pepper, sesame or tahini products, and soy products. Reviewing your diet with a dietitian with expertise in kidney stones is usually helpful.
Choose a diet low in sodium and animal protein. Lower the amount of sodium you eat. And choose protein sources that don't come from meat or fish, such as legumes. Think about using a salt substitute to flavor foods.
Keep eating calcium-rich foods, but use caution with calcium supplements. Calcium in food doesn't have an effect on your risk of kidney stones. Keep eating calcium-rich foods unless your healthcare professional recommends otherwise.

Ask your healthcare professional before taking calcium supplements. These have been linked with a higher risk of kidney stones. You may lower the risk by taking supplements with meals. Diets low in calcium can make kidney stones more likely to form in some people.

Ask your healthcare professional to refer you to a dietitian. The dietitian can help you make an eating plan that lowers your risk of kidney stones.

Medications
Medicines can control the amount of minerals and salts in the urine. They may be helpful in people who form certain kinds of stones. The type of medicine that your healthcare professional prescribes depends on the kind of kidney stones you have. Here are some examples:

Calcium stones. To help prevent calcium stones from forming, your healthcare professional may prescribe a thiazide diuretic or potassium citrate. If you have calcium oxalate stones due to the rare genetic condition primary hyperoxaluria, you may need other treatments to lower the amount of oxalate in your blood. Your healthcare professional may recommend that you take vitamin B6, also called pyridoxine. Or you may need prescription medicines such as lumasiran (Oxlumo) or nedosiran (Rivfloza).
Uric acid stones. Your healthcare professional may prescribe allopurinol (Zyloprim, Aloprim, others) to lower uric acid levels in your blood and urine. You also may be prescribed potassium citrate. Sometimes, these medicines may dissolve existing uric acid stones.
Struvite stones. To prevent struvite stones, your healthcare professional may recommend ways to keep your urine free of bacteria that cause infection. For instance, you may be told to urinate more often and to drink fluids to keep your urine flow good. Rarely, long-term use

of antibiotics in small or occasional doses may help achieve this goal. For instance, your healthcare professional may suggest that you take an antibiotic before and for a while after surgery to treat your kidney stones. Medicines called acetohydroxamic acid also may help prevent struvite stones.
Cystine stones. A diet that's lower in sodium and protein may help prevent cystine stones. Your healthcare professional also may recommend that you drink more fluids so that you urinate more. If those changes alone don't help, medicines called thiol drugs or other newer medicines also may be prescribed. They might make crystals less likely to form.

Kidney cysts are round pouches of fluid that form on or in the kidneys. Kidney cysts can occur with disorders that may impair kidney function. But more often, kidney cysts are a type called simple kidney cysts. Simple kidney cysts aren't cancer and rarely cause problems.

It's not clear what causes simple kidney cysts. Often, one cyst occurs on the surface of a kidney. But more than one cyst can appear on one or both kidneys. Simple kidney cysts aren't the same as cysts that form with polycystic kidney disease. Simple cysts also differ from complex cysts. Complex cysts need to be watched for changes that could be cancer.

Simple kidney cysts are often found during an imaging test for another condition. Treatment usually isn't needed unless simple cysts cause symptoms.
Simple kidney cysts typically don't cause symptoms. But if a simple kidney cyst grows large enough, symptoms may include:

Dull pain in the back or side
Fever
Upper stomach pain
When to see a doctor
Make an appointment with your health care provider if you have symptoms of a kidney cyst.

Causes
It's not clear what causes simple kidney cysts. One theory suggests that kidney cysts develop when the surface layer of the kidney weakens and forms a pouch. The pouch then fills with fluid, detaches and develops into a cyst.

Risk factors
The risk of having simple kidney cysts increases as you get older. But they can occur at any age. Simple kidney cysts are more common in men.

Complications
Kidney cysts may sometimes lead to complications, including:

An infected cyst. A kidney cyst may become infected, causing fever and pain.
A burst cyst. A kidney cyst that bursts causes severe pain in the back or side. Sometimes a burst cyst may cause blood in the urine.
Blocked urine flow. A kidney cyst that blocks the typical flow of urine may lead to kidney swelling.

Kidney Stones

Age and Gender Susceptibility

Kidney stones are most common in adults aged **30 to 60 years**, although they can occur at any age, including in children. Men are more likely to develop kidney stones than women, particularly between the ages of **30 and 50**. However, the gender gap has been narrowing due to lifestyle and dietary changes affecting both sexes.

Symptoms

The hallmark symptom of a kidney stone is **severe, sharp pain**—often described as one of the worst a person can experience. The pain usually originates in the side or back and may radiate to the lower abdomen and groin. Other symptoms include **hematuria** (blood in urine), **nausea and vomiting**, **frequent urination**, and **painful urination**. If a stone causes obstruction and infection, **fever and chills** may also occur.

Medications and Management

Treatment depends on the size and type of the stone. For small stones, **pain relievers** such as **ibuprofen**, **naproxen**, or **acetaminophen** are often sufficient, along with **increased fluid intake** to help pass the stone. **Alpha-blockers** like **tamsulosin** may be prescribed to relax the muscles in the ureter and facilitate stone passage. For larger stones, medical procedures like **extracorporeal shock wave lithotripsy (ESWL)**, **ureteroscopy**, or **percutaneous nephrolithotomy** may be needed. Preventive strategies may include **thiazide diuretics** (for calcium stones), **allopurinol** (for uric acid stones), or **potassium citrate**.

Kidney Tumors

Age and Gender Susceptibility

Kidney tumors, particularly **renal cell carcinoma (RCC)**, are more common in adults over the age of **60**, with the peak incidence between **60 and 70 years**. Men are approximately **twice as likely** as women to develop RCC. In children, a different type of tumor known as **Wilms tumor** typically occurs before age **5**.

Symptoms

In its early stages, kidney cancer may be asymptomatic. As it progresses, symptoms may include **persistent back or flank pain**, a **palpable abdominal mass**, **hematuria**, **unexplained weight loss**, **fatigue**, and **intermittent fever**. Because of the kidney's deep location in the body, tumors often grow large before detection.

Medications and Management

Treatment depends on the stage and type of tumor. **Surgical removal** of the tumor (partial or radical nephrectomy) is the most common treatment. For advanced stages or metastatic cancer, **targeted therapies** like **sunitinib**, **pazopanib**, or **axitinib** are often used. **Immunotherapy** agents such as **nivolumab** or **pembrolizumab** have also shown success. Chemotherapy is generally less effective in RCC but may be used in non-clear cell variants. Wilms tumor in children is usually treated with **nephrectomy followed by chemotherapy and/or radiation**.

Kidney Cysts

Age and Gender Susceptibility

Simple kidney cysts are quite common and usually develop as part of the aging process, often appearing in individuals over **50 years of age**. They are slightly more common in men than in women. In contrast, **polycystic kidney disease (PKD)** is a genetic disorder that can present in **childhood or early adulthood**, depending on whether it is the autosomal recessive or autosomal dominant form.

Symptoms

Most simple kidney cysts are **asymptomatic** and are discovered incidentally during imaging for other reasons. However, if they grow large or become infected or bleed, they may cause **dull flank pain**, **fever**, or **blood in the urine**. PKD often leads to **high blood pressure**, **back or side pain**, **kidney stones**, **frequent urinary tract infections**, and **progressive kidney failure**.

Medications and Management

For simple cysts that do not cause symptoms, no treatment is necessary. If symptomatic, **aspiration** or **sclerotherapy** (draining the cyst and injecting a sclerosing agent) may be performed. In more severe cases, **laparoscopic surgery** may be required. For PKD, treatment focuses on **managing complications**, particularly **hypertension** with **ACE inhibitors** or **ARBs**, and **slowing progression** of the disease with drugs like **tolvaptan**, a vasopressin receptor antagonist. Patients may eventually need **dialysis** or a **kidney transplant**.