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Kidney Cancer Treatment

Local treatments

Some treatments are called *local therapies*, meaning they treat the tumor without affecting the rest of the body. These treatments are more likely to be useful for earlier stage (less advanced) cancers, although they might also be used in some other situations.

- [Surgery for Kidney Cancer](#)
- [Ablation and Other Local Therapy for Kidney Cancer](#)
- [Active Surveillance for Kidney Cancer](#)
- [Radiation Therapy for Kidney Cancer](#)

Systemic treatments

Kidney cancer can also be treated using drugs, which can be given by mouth or directly into the bloodstream. These are called *systemic therapies* because they can reach cancer cells almost anywhere in the body. Depending on the type of kidney cancer, several different types of drugs might be used.

- [Targeted Therapy for Kidney Cancer](#)
- [Immunotherapy for Kidney Cancer](#)
- [Chemotherapy for Kidney Cancer](#)

Common treatment approaches

Depending on the [stage of the cancer](#)¹ and other factors, different types of treatment may be combined at the same time or used after one another. Some of these treatments can also be used as palliative treatment when all the cancer cannot be

removed. [Palliative treatment](#)² is meant to relieve symptoms, such as pain, but it is not expected to cure the cancer.

- [Treatment Choices by Stage for Kidney Cancer](#)

Who treats kidney cancer?

Doctors on your cancer treatment team might include:

- A **urologist**: a doctor who specializes in treating diseases of the urinary system (and male reproductive system)
- A **radiation oncologist**: a doctor who treats cancer with radiation therapy
- A **medical oncologist**: a doctor who treats cancer with medicines such as chemotherapy or targeted therapy

You might have many other specialists on your treatment team as well, including physician assistants (PAs), nurse practitioners (NPs), nurses, psychologists, nutritionists, social workers, and other health professionals.

- [Health Professionals Associated With Cancer Care](#)³

Making treatment decisions

It's important to discuss all treatment options, including their goals and possible side effects, with your doctors to help make the decision that best fits your needs. You may feel that you need to make a decision quickly, but it's important to give yourself time to absorb the information you have learned. Ask your cancer care team questions.

If time permits, it is often a good idea to seek a second opinion. A second opinion can give you more information and help you feel more confident about the treatment plan you choose.

- [What Should You Ask Your Doctor About Kidney Cancer?](#)⁴
- [Seeking a Second Opinion](#)⁵

Thinking about taking part in a clinical trial

Clinical trials are carefully controlled research studies that are done to get a closer look at promising new treatments or procedures. Clinical trials are one way to get state-of-

the art cancer treatment. In some cases they may be the only way to get access to newer treatments. They are also the best way for doctors to learn better methods to treat cancer. Still, they're not right for everyone.

If you would like to learn more about clinical trials that might be right for you, start by asking your doctor if your clinic or hospital conducts clinical trials.

- [Clinical Trials⁶](#)

Considering complementary and alternative methods

You may hear about alternative or complementary methods that your doctor hasn't mentioned to treat your cancer or relieve symptoms. These methods can include vitamins, herbs, and special diets, or other methods such as acupuncture or massage, to name a few.

Complementary methods refer to treatments that are used along with your regular medical care. Alternative treatments are used instead of a doctor's medical treatment. Although some of these methods might be helpful in relieving symptoms or helping you feel better, many have not been proven to work. Some might even be harmful.

Be sure to talk to your cancer care team about any method you are thinking about using. They can help you learn what is known (or not known) about the method, which can help you make an informed decision.

- [Complementary and Alternative Medicine⁷](#)

Help getting through cancer treatment

People with cancer need support and information, no matter what stage of illness they may be in. Knowing all of your options and finding the resources you need will help you make informed decisions about your care.

Whether you are thinking about treatment, getting treatment, or not being treated at all, you can still get supportive care to help with pain or other symptoms. Communicating with your cancer care team is important so you understand your diagnosis, what treatment is recommended, and ways to maintain or improve your quality of life.

Different types of programs and support services may be helpful, and can be an important part of your care. These might include nursing or social work services, financial aid, nutritional advice, rehab, or spiritual help.

The American Cancer Society also has programs and services – including rides to treatment, lodging, and more – to help you get through treatment. Call our National Cancer Information Center at 1-800-227-2345 and speak with one of our trained specialists.

- [Palliative Care](#)⁸
- [Find Support Programs and Services in Your Area](#)⁹

Choosing to stop treatment or choosing no treatment at all

For some people, when treatments have been tried and are no longer controlling the cancer, it could be time to weigh the benefits and risks of continuing to try new treatments. Whether or not you continue treatment, there are still things you can do to help maintain or improve your quality of life.

Some people, especially if the cancer is advanced, might not want to be treated at all. There are many reasons you might decide not to get cancer treatment, but it's important to talk to your doctors and you make that decision. Remember that even if you choose not to treat the cancer, you can still get supportive care to help with pain or other symptoms.

- [If Cancer Treatments Stop Working](#)¹⁰

The treatment information given here is not official policy of the American Cancer Society and is not intended as medical advice to replace the expertise and judgment of your cancer care team. It is intended to help you and your family make informed decisions, together with your doctor. Your doctor may have reasons for suggesting a treatment plan different from these general treatment options. Don't hesitate to ask him or her questions about your treatment options.

Surgery for Kidney Cancer

Surgery is the main treatment for most kidney cancers. The chances of surviving kidney cancer without having surgery are small.

Even people whose cancer has spread to other organs may benefit from surgery to take

out the kidney tumor. Removing the kidney containing the cancer can help some people live longer, so a doctor may suggest surgery even if the cancer has spread beyond the kidney. Kidney removal can also be used to ease symptoms such as pain and bleeding.

Depending on the stage and location of the cancer and other factors, surgery might be done to remove either the cancer along with some of the surrounding kidney tissue (known as a *partial nephrectomy*), or the entire kidney (known as a *radical nephrectomy*). The adrenal gland (the small gland that sits on top of each kidney) and fatty tissue around the kidney is sometimes removed as well.

Radical nephrectomy

In this operation, the surgeon removes your whole kidney, the attached adrenal gland, nearby lymph nodes, and the fatty tissue around the kidney. Most people do just fine with only one working kidney.

The surgeon can make the incision in several places. The most common sites are the middle of the abdomen (belly), under the ribs on the same side as the cancer, or in the back, just behind the kidney. Each approach has its advantages in treating cancers of different sizes and in different parts of the kidney. Although removing the adrenal gland is a part of a standard radical nephrectomy, the surgeon may be able to leave it behind in some cases where the cancer is in the lower part of the kidney and is far away from the adrenal gland.

If the tumor has grown from the kidney through the renal vein (the vein leading away from the kidney) and into the inferior vena cava (the large vein that empties into the heart), the heart may need to be stopped for a short time in order to remove the tumor. The patient is put on cardiopulmonary bypass (a heart-lung machine) that circulates the blood while bypassing the heart. If you need this, a heart surgeon will work with your urologist during your operation.

Laparoscopic nephrectomy and robotic-assisted laparoscopic nephrectomy:

These newer approaches to the operation are done through several small incisions instead of one large one. If a radical nephrectomy is needed, many doctors and patients now prefer these approaches when they can be used.

For a laparoscopic nephrectomy, special long instruments are inserted through the incisions, each of which is about 1/2-inch (1.27cm) long, to remove the kidney. One of the instruments, the laparoscope, is a long tube with a small video camera on the end. This lets the surgeon see inside the abdomen. Usually, one of the incisions has to be made longer in order to remove the kidney (although it's not as long as the incision for a

standard nephrectomy).

A newer approach is to do the laparoscopic surgery remotely using a robotic system. The surgeon sits at a panel near the operating table and controls robotic arms to perform the operation. For the surgeon, the robotic system may provide more maneuverability and more precision when moving the instruments than standard laparoscopic surgery. But the most important factor in the success of either type of laparoscopic surgery is the surgeon's experience and skill. This is a difficult approach to learn. If you are considering this type of operation, be sure to find a surgeon with a lot of experience.

The laparoscopic approach can be used to treat most renal tumors that cannot be treated with nephron-sparing surgery (see below). In experienced hands, the technique is as effective as a standard (open) radical nephrectomy and usually results in a shorter hospital stay, a faster recovery, and less pain after surgery. This approach may not be an option for tumors larger than about 10 cm (4 inches) across or tumors that have grown into the renal vein or spread to lymph nodes around the kidney.

Partial nephrectomy (nephron-sparing surgery)

In this procedure, the surgeon removes only the part of the kidney that contains cancer, leaving the rest of the kidney behind. As with a radical nephrectomy, the surgeon can make the incision in several places, depending on factors like the location of the tumor.

Partial nephrectomy is now the preferred treatment for many people with early stage kidney cancer. It is often done to remove single small tumors (less than 4 cm across), and can also be done to remove larger tumors (up to 7 cm across). Studies have shown the long-term results to be about the same as when the whole kidney is removed. The obvious benefit is that the patient keeps more of their kidney function.

A partial nephrectomy might not be an option if the tumor is in the middle of the kidney or is very large, if there is more than one tumor in the same kidney, or if the cancer has spread to the lymph nodes or distant organs. Not all doctors can do this type of surgery. It should only be done by someone with a lot of experience.

Laparoscopic partial nephrectomy and robotic-assisted laparoscopic partial nephrectomy: Many doctors now do partial nephrectomies laparoscopically or using a robot (as described above). But again, this is a difficult operation, and it should only be done by a surgeon with a great deal of experience.

Regional lymphadenectomy (lymph node dissection)

This procedure removes nearby lymph nodes to see if they contain cancer. Some doctors do this when doing a radical nephrectomy. The number of lymph nodes removed may be more extensive if the tumor has characteristics suggesting it has a high risk to spread.

Most doctors agree that the lymph nodes should be removed if they look enlarged on imaging tests or feel abnormal during the operation. Some doctors also remove these lymph nodes to check them for cancer spread even when they aren't enlarged, in order to better stage the cancer. Before surgery, ask your doctor if they plan to remove the lymph nodes near the kidney.

Removal of an adrenal gland (adrenalectomy)

Although this is a standard part of a radical nephrectomy, if the cancer is in the lower part of the kidney (away from the adrenal gland) and imaging tests show the adrenal gland is not affected, it may not have to be removed. Just like with lymph node removal, this is decided on an individual basis and should be discussed with the doctor before surgery.

Removal of metastases

In about 1 in 4 people with kidney cancer, the cancer will already have spread (metastasized) to other parts of the body when it is diagnosed. The lungs, lymph nodes, bones, and liver are the most common sites of spread. For some people, surgery may still be helpful.

Attempts at curative surgery: In rare cases where there is only a single metastasis or if there are only a few that can be removed easily without causing serious side effects, surgery may lead to long-term survival in some people.

The metastasis may be removed at the same time as a radical nephrectomy or at a later time if the cancer recurs (comes back).

Surgery to relieve symptoms (palliative surgery): When other treatments aren't helpful, surgically removing the metastases can sometimes relieve pain and other symptoms, although this usually does not help people live longer.

Risks and side effects of surgery

The short-term risks of any type of surgery include reactions to anesthesia, excess

bleeding (which might require blood transfusions), blood clots, and infections. Most people will have at least some pain after the operation, which can usually be helped with pain medicines, if needed.

Other possible risks of surgery include:

- Damage to internal organs and blood vessels (such as the spleen, pancreas, aorta, vena cava, large or small bowel) during surgery
- Pneumothorax (unwanted air in the chest cavity)
- Incisional hernia (bulging of internal organs near the surgical incision due to problems with wound healing)
- Leakage of urine into the abdomen (after partial nephrectomy)
- Kidney failure (if the remaining kidney fails to function well)

For more general information about surgery as a treatment for cancer, see [Cancer Surgery](#)^{1,2}

Hyperlinks

1. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/surgery.html
2. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/surgery.html

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Ablation and Other Local Therapy for Kidney Cancer

Whenever possible, [surgery](#) is the main treatment for kidney cancers that can be removed. But for people who are too sick to have surgery, other approaches can sometimes be used to destroy kidney tumors. They might be helpful for some people, but there is much less data on how well they work over time than there is for surgery, so they are not yet considered a standard treatment.

Cryotherapy (cryoablation)

This approach uses extreme cold to destroy the tumor. A hollow probe (needle) is inserted into the tumor either through the skin (percutaneously) or during laparoscopy (see [Surgery for Kidney Cancer](#)). Very cold gases are passed through the probe, creating an ice ball at its tip that destroys the tumor. To be sure the tumor is destroyed without too much damage to nearby tissues, the doctor carefully watches images of the tumor during the procedure (with ultrasound) or measures tissue temperature.

The type of anesthesia used for cryotherapy depends on how the procedure is being done. Possible side effects include bleeding and damage to the kidneys or other nearby organs.

Radiofrequency ablation (RFA)

This technique uses high-energy radio waves to heat the tumor. A thin, needle-like probe is placed through the skin and advanced until the end is in the tumor. Placement

of the probe is guided by ultrasound or CT scans. Once it is in place, an electric current is passed through the tip of the probe, which heats the tumor and destroys the cancer cells.

RFA is usually done as an outpatient procedure, using local anesthesia (numbing medicine) where the probe is inserted. You may be given medicine to help you relax as well.

Major complications are uncommon, but they can include bleeding and damage to the kidneys or other nearby organs.

Arterial embolization

This technique is used to block the artery that feeds the kidney that has the tumor. A small catheter (tube) is placed in an artery in the inner thigh and is moved up until it reaches the renal artery going from the aorta to the kidney. Material is then injected into the artery to block it, cutting off the kidney's blood supply. This will cause the kidney (and the tumor in it) to die.

Although this procedure is not used very often, it is sometimes done before a [radical nephrectomy](#) to reduce bleeding during the operation or in patients who have persistent bleeding from the kidney tumor.

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Active Surveillance for Kidney Cancer

One option for some people with small kidney tumors (less than 4 cm[about 1½ inches]), may be to give no treatment at first and watch the tumor carefully to see if it grows. The tumor is removed (or treated another way) if it grows quickly or gets larger than 4 cm.

This approach is most often used for elderly or frail patients as it avoids the risks of treatment, such as surgery or ablation. Often, a biopsy is done before deciding to watch the tumor to see if the growth is really cancer. Some of these small tumors turn out not to be cancers at all. Watching them closely for a time helps doctors decide which tumors are more likely to be cancer based on their growth.

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Radiation Therapy for Kidney Cancer

Radiation therapy uses high-energy radiation to kill cancer cells.

Kidney cancers are not very sensitive to radiation, but it is sometimes used if a person is not healthy enough to have [surgery](#). Sometimes [other treatments](#) will be tried first instead. When radiation therapy is used to treat kidney cancer, it is usually *external beam therapy*, which focuses radiation from a source outside the body on the cancer.

For people with kidney cancer, radiation therapy is more often used to *palliate*, or ease, cancer symptoms such as pain, bleeding, or problems caused by cancer spread (especially to the bones or brain).

Possible side effects

Side effects of radiation therapy depend on where it is aimed and can include skin changes (similar to sunburn) and hair loss where the radiation passes through the skin, nausea, diarrhea, or tiredness. Often these go away after a short while. Radiation may also make side effects from some other treatments worse.

More information about radiation therapy

To learn more about how radiation is used to treat cancer, see [Radiation Therapy](#)¹.

To learn about some of the side effects listed here and how to manage them, see [Managing Cancer-related Side Effects](#)².

Hyperlinks

1. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/radiation.html
2. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html

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Targeted Therapy for Kidney Cancer

As researchers have learned more about the molecular and genetic changes in cells that cause cancer, they have developed drugs that target some of these changes. These targeted drugs are different from standard [chemotherapy](#) drugs. They sometimes work when standard chemo drugs don't, and they often have different side effects.

Targeted drugs are proving to be especially important in kidney cancer, where chemotherapy has not been shown to be very effective.

When might targeted drugs be used?

Treating advanced kidney cancer

All of the targeted drugs below can be used to treat advanced kidney cancers. They can often shrink or slow the growth of the cancer for a time, but it doesn't seem that any of these drugs can actually cure kidney cancer.

Targeted drugs are most often used one at a time. If one doesn't work, another can be tried. It's not yet known if any one of these drugs is clearly better than the others, if combining them might be more helpful than giving them one at a time, or if one sequence is better than another. Studies are being done to help answer these questions.

Adjuvant therapy after surgery

Sunitinib (Sutent) can also be used after [surgery](#) is done to remove the cancer, to help lower the risk that the cancer will come back. This is known as *adjuvant therapy*.

Which targeted drugs are used to treat kidney cancer?

The targeted drugs used to treat advanced kidney cancer work by blocking angiogenesis (growth of the new blood vessels that nourish cancers) or important proteins in cancer cells (called *tyrosine kinases*) that help them grow and survive. Some targeted drugs affect both.

Sorafenib (Nexavar)

Sorafenib acts by blocking both angiogenesis and growth-stimulating proteins in the

cancer cell itself. Sorafenib does this by blocking several tyrosine kinases that are important for cell growth and survival. It is taken as a pill twice a day.

The most common side effects seen with this drug include fatigue, rash, diarrhea, increases in blood pressure, and redness, pain, swelling, or blisters on the palms of the hands or soles of the feet (hand-foot syndrome).

Sunitinib (Sutent)

Sunitinib also blocks several tyrosine kinases, similar to the ones blocked by sorafenib. It attacks both blood vessel growth and other targets that help cancer cells grow. This drug is taken as a pill.

The most common side effects are nausea, diarrhea, changes in skin or hair color, mouth sores, weakness, and low white and red blood cell counts. Other possible effects include tiredness, high blood pressure, congestive heart failure, bleeding, hand-foot syndrome, and low thyroid hormone levels.

Temsirolimus (Torisel)

Temsirolimus works by blocking a protein known as *mTOR*, which normally helps cells grow and divide. This drug has been shown to be helpful against advanced kidney cancers that have a poorer prognosis because of certain factors. It is given as an intravenous (IV) infusion, typically once a week.

The most common side effects of this drug include skin rash, weakness, mouth sores, nausea, loss of appetite, fluid buildup in the face or legs, and increases in blood sugar and cholesterol levels. Rarely, more serious side effects have been reported.

Everolimus (Afinitor)

Everolimus also blocks the mTOR protein. It is used to treat advanced kidney cancers after other drugs such as sorafenib or sunitinib have been tried. Everolimus is taken as a pill once a day.

Common side effects of this drug include mouth sores, an increased risk of infections, nausea, loss of appetite, diarrhea, skin rash, feeling tired or weak, fluid buildup (usually in the legs), and increases in blood sugar and cholesterol levels. A less common but serious side effect is lung damage, which can cause shortness of breath or other problems.

Bevacizumab (Avastin)

Bevacizumab is an IV drug that works by slowing the growth of new blood vessels. It may help some people with kidney cancer when used with [interferon-alfa](#).

More common side effects include high blood pressure, tiredness, and headaches. Less common but possibly serious side effects include bleeding, blood clots, holes forming in the intestines, heart problems, and slow wound healing.

Pazopanib (Votrient)

Pazopanib is another drug that blocks several tyrosine kinases involved in cancer cell growth and the formation of new blood vessels in the tumor. It is taken as a pill once a day.

Common side effects include high blood pressure, nausea, diarrhea, headaches, low blood cell counts, and liver problems. It can cause lab test results of liver function to become abnormal, but it rarely leads to severe liver damage that could be life threatening. Problems with bleeding, clotting, and wound healing can occur, as well. In rare cases it can also cause a problem with the heart rhythm or even a heart attack. If you are taking this drug, your doctor will monitor your heart with EKGs as well as check your blood tests to check for liver or other problems.

Axitinib (Inlyta)

Axitinib also inhibits several tyrosine kinases involved in the formation of new blood vessels. It can be used by itself after at least one other treatment has been tried, or it can be used with certain [immunotherapy](#) drugs, like pembrolizumab or avelumab, as the first treatment for people with advanced kidney cancer. Axitinib is taken as a pill twice a day.

Common side effects include high blood pressure, fatigue, nausea and vomiting, diarrhea, poor appetite and weight loss, voice changes, hand-foot syndrome, and constipation. High blood pressure requiring treatment is fairly common, but in a small number of patients it can get high enough to be life-threatening. It can also cause problems with bleeding, clotting, and wound healing. In some patients, lab test results of liver function can become abnormal. Axitinib may also cause the thyroid gland to become underactive, so your doctor will watch your blood levels of thyroid hormone while you are on this drug.

Cabozantinib (Cabometyx)

Cabozantinib is another drug that blocks several tyrosine kinases, including some that help form new blood vessels. It is taken as a pill once a day.

Common side effects include diarrhea, fatigue, nausea and vomiting, poor appetite and weight loss, high blood pressure, hand-foot syndrome, and constipation. Less common but more serious side effects can include serious bleeding, blood clots, very high blood pressure, severe diarrhea, and holes forming in the intestines.

Lenvatinib (Lenvima)

Lenvatinib (Lenvima) is another kinase inhibitor that helps block tumors from forming new blood vessels, as well as targeting some of the proteins in cancer cells that normally help them grow. It is typically used along with everolimus after at least one other treatment has been tried. Lenvatinib is taken as capsules once a day.

Common side effects include diarrhea, fatigue, joint or muscle pain, loss of appetite, nausea and vomiting, mouth sores, weight loss, high blood pressure, and swelling in the arms or legs. Less common but more serious side effects can include serious bleeding, blood clots, very high blood pressure, severe diarrhea, holes forming in the intestines, and kidney, liver, or heart failure.

More information about targeted therapy

To learn more about how targeted drugs are used to treat cancer, see [Targeted Cancer Therapy](#)¹.

To learn about some of the side effects listed here and how to manage them, see [Managing Cancer-related Side Effects](#)².

Hyperlinks

1. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/targeted-therapy.html
2. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html

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Immunotherapy for Kidney Cancer

Immunotherapy is the use of medicines to boost a person's own immune system to recognize and destroy cancer cells more effectively. Several types of immunotherapy can be used to treat kidney cancer.

Immune checkpoint inhibitors

An important part of the immune system is its ability to keep itself from attacking normal cells in the body. To do this, it uses “checkpoints,” which are proteins on immune cells that need to be turned on (or off) to start an immune response. Kidney cancer cells sometimes use these checkpoints to avoid being attacked by the immune system. But these drugs target the checkpoint proteins, helping to restore the immune response

against the cancer cells.

PD-1 inhibitors

Pembrolizumab (Keytruda) and Nivolumab (Opdivo) are drugs that target PD-1, a protein on immune system cells (called *T cells*) that normally help keep these cells from attacking other cells in the body. By blocking PD-1, these drugs boost the immune response against kidney cancer cells. This can often shrink some tumors or slow their growth.

- Pembrolizumab can be used with the [targeted drug](#) axitinib as the first treatment for people with advanced kidney cancer.
- Nivolumab can be used for people whose kidney cancer starts growing again after other drug treatments.
- For patients with intermediate or poor risk advanced kidney cancer who have not received any treatment, nivolumab can be given with ipilimumab (a CTLA-4 inhibitor) for 4 doses followed by nivolumab alone. Ipilimumab is discussed below.

Nivolumab is given as an intravenous (IV) infusion every 2, 3 or 4 weeks. Pembrolizumab is given every 3 weeks as an IV infusion.

Possible side effects

Side effects of PD-1 inhibitors can include fatigue, cough, nausea, itching, skin rash, loss of appetite, constipation, joint pain, and diarrhea.

Other, more serious side effects occur less often. These drugs work by basically removing the brakes on the body's immune system. Sometimes the immune system starts attacking other parts of the body, which can cause serious or even life-threatening problems in the lungs, intestines, liver, hormone-making glands (like the thyroid), kidneys, or other organs.

It's very important to report any new side effects to your health care team promptly. If serious side effects do occur, treatment may need to be stopped and you may get high doses of corticosteroids to suppress your immune system and treat the side effects.

PD-L1 inhibitors

Avelumab (Bavencio) targets PD-L1, a protein related to PD-1 that is found on some tumor cells and immune cells. Blocking the PD-L1 protein can help boost

the immune response against cancer cells. This can often shrink some tumors or slow their growth.

Avelumab can be used with the [targeted drug](#) axitinib as the first treatment for people with advanced kidney cancer. It is given every 2 weeks as an IV infusion.

Possible side effects

The most common side effects from avelumab with axitinib include fatigue, diarrhea, high blood pressure, skin rash or blistering, cough, shortness of breath, or abdominal pain.

Like the PD-1 inhibitors, this drug can cause the immune system to attack other parts of the body, which can lead to serious problems in the intestines, liver, hormone-making glands, nerves, skin, eyes, or other organs. In some people these side effects can be life threatening.

It's very important to report any new side effects during or after treatment to your health care team promptly. If serious side effects do occur, you may need to stop treatment and take high doses of corticosteroids to suppress your immune system.

CTLA-4 inhibitors

Ipilimumab (Yervoy) is another drug that boosts the immune response, but it has a different target. It blocks CTLA-4, another protein on T cells that normally helps keep them in check.

For patients with intermediate or poor risk advanced kidney cancer who have not received any treatment, ipilimumab can be given with nivolumab (a PD-1 inhibitor) for 4 doses followed by nivolumab alone.

Ipilimumab is given as an intravenous (IV) infusion, usually once every 3 weeks for 4 treatments.

Possible side effects

The most common side effects from ipilimumab include fatigue, diarrhea, skin rash, and itching.

Like the PD-1 inhibitors, this drug can cause the immune system to attack other parts of the body, which can lead to serious problems in the intestines, liver, hormone-making

glands, nerves, skin, eyes, or other organs. In some people these side effects can be life threatening.

It's very important to report any new side effects during or after treatment to your health care team promptly. If serious side effects do occur, you may need to stop treatment and take high doses of corticosteroids to suppress your immune system.

Cytokines

Cytokines are small proteins that boost the immune system in a general way. Man-made versions of cytokines, such as interleukin-2 (IL-2) and interferon-alpha, are sometimes used to treat kidney cancer. Both cytokines can cause kidney cancers to shrink in a small percentage of patients.

Interleukin-2 (IL-2)

In the past, IL-2 was commonly used as first-line therapy for advanced kidney cancer, and it may still be helpful for some people. But it can cause serious side effects, so many doctors only use it for people who are healthy enough to tolerate the side effects, or for cancers that aren't responding to [targeted drugs](#) or other types of immunotherapy.

Giving high doses of IL-2 seems to offer the best chance of shrinking the cancer, but this can cause serious side effects, so it is not used in people who are in poor overall health. Special care is needed to recognize and treat these side effects. Because of this, high-dose IL-2 is only given in the hospital at certain centers that are experienced with giving this type of treatment. IL-2 is given through a vein (IV).

The possible side effects of high-dose IL-2 include:

- Extreme fatigue
- Low blood pressure
- Fluid buildup in the lungs
- Trouble breathing
- Kidney damage
- Heart attacks
- Intestinal bleeding
- Diarrhea or abdominal pain
- High fever and chills
- Rapid heart beat
- Mental changes

These side effects are often severe and, rarely, can be fatal. Only doctors experienced in the use of these drugs should give this treatment.

Interferon-alfa

Interferon has less serious side effects than IL-2, but it does not seem to be as effective when used by itself. It is more often used in combination with the [targeted drug bevacizumab \(Avastin\)](#). Interferon is given as a subcutaneous injection (under the skin) usually three times a week.

Common side effects of interferon include flu-like symptoms (fever, chills, muscle aches), fatigue, and nausea.

More information about immunotherapy

To learn more about how immunotherapy drugs are used to treat cancer, see [Cancer Immunotherapy](#)¹.

To learn about some of the side effects listed here and how to manage them, see [Managing Cancer-related Side Effects](#)².

Hyperlinks

1. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/immunotherapy.html
2. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html

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Chemotherapy for Kidney Cancer

Chemotherapy (chemo) uses anti-cancer drugs that are given into a vein (IV) or taken by mouth (as pills). These drugs enter your blood and reach nearly all areas of the body, which makes this treatment potentially useful for cancer that has spread (metastasized) to organs beyond the kidney.

Unfortunately, kidney cancer cells usually do not respond well to chemo, so chemo is not a standard treatment for kidney cancer. Some chemo drugs, such as vinblastine, floxuridine, 5-fluorouracil (5-FU), capecitabine, and gemcitabine have been shown to help a small number of patients. Still, chemo is often only used for kidney cancer after [targeted drugs](#) and/or [immunotherapy](#) have already been tried.

Doctors give chemotherapy in cycles, with each period of treatment followed by a rest period to allow the body time to recover. Chemo cycles generally last a few weeks.

Possible side effects of chemotherapy

Chemo drugs attack cells that are dividing quickly, which is why they often work against cancer cells. But other cells in the body, such as those in the bone marrow (where new blood cells are made), the lining of the mouth and intestines, and the hair follicles, also divide quickly. These cells are also likely to be affected by chemo, which can lead to certain side effects.

The side effects of chemo depend on the type of drugs, the amount taken, and the length of treatment. Possible side effects can include:

- Hair loss
- Mouth sores
- Loss of appetite
- Nausea and vomiting
- Diarrhea or constipation
- Increased chance of infections (due to low white blood cell counts)
- Easy bruising or bleeding (due to low blood platelet counts)
- Fatigue (due to low red blood cell counts)

These side effects usually go away after treatment is finished. There are often ways to prevent or lessen them. For example, drugs can be given to help prevent or reduce nausea and vomiting. Specific chemo drugs may each cause specific side effects. Ask

your health care team about the side effects your chemo drugs may cause.

More information about chemotherapy

For more general information about how chemotherapy is used to treat cancer, see [Chemotherapy](#)¹.

To learn about some of the side effects listed here and how to manage them, see [Managing Cancer-related Side Effects](#)².

Hyperlinks

1. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/chemotherapy.html
2. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html

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Treatment Choices by Stage for Kidney Cancer

The type of treatment(s) your doctor recommends will depend on the [stage](#)¹ of the cancer and on your overall health. This section sums up the options usually considered for each stage of kidney cancer.

Stages I, II, or III

Stage I and II cancers are still contained within the kidney. Stage III cancers have either grown into nearby large veins or have spread to nearby lymph nodes.

These cancers are usually removed with [surgery](#) when possible. There are two common approaches:

- Partial nephrectomy (removing part of the kidney). This is often the treatment of choice in tumors up to 7 cm (a little less than 3 inches) if it can be done.
- Radical nephrectomy (removing the entire kidney).

The lymph nodes near the kidney may be removed as well, especially if they are enlarged.

If the cancer has grown into nearby veins (as with some stage III cancers), your surgeon may need to cut open these veins to remove all of the cancer. This may require putting you on bypass (a heart-lung machine), so that the heart can be stopped for a short time to remove the cancer from the large vein leading to the heart.

After surgery, some people at high risk of the cancer returning might be helped by getting the [targeted drug](#) sunitinib (Sutent) for about a year, which can help lower this risk. Treatment given after surgery is known as *adjuvant therapy*. Sunitinib can have side effects, so it's important to talk to your doctor about the benefits and risks. [Clinical trials](#)² are also looking at other adjuvant treatments for kidney cancer. Ask your doctor if you are interested in learning more about adjuvant therapies being studied in clinical trials.

If you cannot have kidney surgery because of other serious medical problems, you might benefit from [other local treatments](#) such as cryotherapy, radiofrequency ablation, or arterial embolization. Radiation therapy may be another option. These treatments are

generally only given when surgery can't be done. Although these types of treatments can have similar outcomes to surgery as far as the chances of the cancer spreading to other parts of the body, some studies show the cancer might be more likely to come back in the same area.

[Active surveillance](#) is another option for some people with small kidney tumors. With active surveillance, the tumor is watched closely (with CTs or ultrasounds) and only treated if it grows.

Stage IV

Stage IV kidney cancer means the cancer has grown outside of the kidney or has spread to other parts of the body such as distant lymph nodes or other organs.

Treatment of stage IV kidney cancer depends on how extensive the cancer is and on the person's general health. In some cases, [surgery](#) may still be a part of treatment.

In rare cases where the main tumor appears to be removable and the cancer has only spread to one other area (such as to one or a few spots in the lungs), surgery to remove both the kidney and the metastasis (the outside area of cancer spread) may be an option if a person is in good enough health. Otherwise, treatment with immunotherapy, one of the [targeted therapies](#), or a combination of the two is usually the first option.

If the main tumor is removable but the cancer has spread extensively elsewhere, removing the kidney may still be helpful. This would likely be followed by systemic therapy, which might consist of one of the targeted therapies, [immunotherapy](#), or a combination of the two. It's not clear if any one of these therapies or any particular sequence is better than another, although temsirolimus appears to be most helpful for people with kidney cancers that have a poorer prognosis (outlook).

For cancers that can't be removed surgically (because of the extent of the tumor or the person's health), first-line treatment is likely to be one of the targeted therapies, immunotherapy, or a combination.

Because advanced kidney cancer is very hard to cure, [clinical trials](#)³ of new combinations of targeted therapies, immunotherapy, or other new treatments are also options.

For some people, palliative treatments such as [embolization](#) or [radiation therapy](#) may be the best option. A special form of radiation therapy called *stereotactic radiosurgery* can be very effective in treating single brain metastases. Surgery or radiation therapy

can also be used to help reduce pain or other symptoms of metastases in some other places, such as the bones. You can read more about palliative treatment for cancer in [Palliative \(Supportive\) Care](#)⁴ or in [Advanced Cancer, Metastatic Cancer, and Bone Metastasis](#)⁵.

Having your [pain controlled](#)⁶ can help you maintain your quality of life. Medicines to relieve pain do not interfere with your other treatments, and controlling pain will often help you be more active and continue your daily activities.

Recurrent cancer

Cancer is called *recurrent* when it come backs after treatment. Recurrence can be local (near the area of the initial tumor) or it may be in distant organs. Treatment of kidney cancer that comes back (recurs) after initial treatment depends on where it recurs and what treatments have been used, as well as a person's health and wishes for further treatment.

Local recurrence

For cancers that recur after initial surgery, further surgery might be an option. Otherwise, treatment with targeted therapies or immunotherapy will probably be recommended. Clinical trials of new treatments are an option as well.

Distant recurrence

Kidney cancer that recurs in distant parts of the body is treated like a stage IV cancer. Your options depend on which, if any, drugs you received before the cancer came back and how long ago you received them, as well as on your health.

For cancers that progress (continue to grow or spread) during treatment with targeted therapy or immunotherapy, another type of targeted therapy or immunotherapy may be helpful. If these don't work, [chemotherapy](#) may be tried, especially for people with non-clear cell types of renal cell cancer. Recurrent cancers can sometimes be hard to treat, so you might also want to ask your doctor about [clinical trials](#)⁷ of newer treatments.

For some people with recurrent kidney cancer, palliative treatments such as embolization or radiation therapy may be the best option. Controlling symptoms such as [pain](#)⁸ is an important part of treatment at any stage of the disease.

For more information see [Understanding Recurrence](#)⁹.

The treatment information given here is not official policy of the American Cancer Society and is not intended as medical advice to replace the expertise and judgment of your cancer care team. It is intended to help you and your family make informed decisions, together with your doctor. Your doctor may have reasons for suggesting a treatment plan different from these general treatment options. Don't hesitate to ask him or her questions about your treatment options.

Hyperlinks

1. www.cancer.org/cancer/kidney-cancer/detection-diagnosis-staging/staging.html
2. www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html
3. www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html
4. www.cancer.org/treatment/treatments-and-side-effects/palliative-care/supportive-care-guide.html
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