

# Kidney

## Introduction

In 2000 more than 300 people in Malaysia were diagnosed with kidney cancer. This information has been written to help people with kidney cancer and their families and friends to better understand this disease. We hope others will read it as well to learn more about kidney cancer.

This information discusses symptoms, diagnosis, treatment, and follow up care. It also has information to help patients cope with kidney cancer.

## The Kidneys

The kidneys are two reddish-brown, bean-shaped organs located just above the waist, one on each side of the spine. They are part of the urinary system. Their main function is to filter blood and produce urine to rid the body of waste. As blood flows through the kidneys, they remove waste products and unneeded water. The resulting liquid, urine, collects in the middle of each kidney in an area called the renal pelvis. Urine drains from each kidney through a long tube, the ureter, into the bladder, where it is stored. Urine leaves the body through another tube, called the urethra. The kidneys also produce substances that help control blood pressure and regulate the formation of red blood cells.

## What Is Cancer?

Cancer is a group of many different diseases that have some important things in common. They all affect cells, the body's basic unit of life. To understand cancer, it is helpful to know about normal cells and about what happens when cells become cancerous. The body is made up of many types of cells. Normally, cells grow and divide to produce more cells only when the body needs them. This orderly process helps keep the body healthy. Sometimes cells keep dividing when new cells are not needed. A mass of extra tissue forms, and this mass is called a growth or tumour. Tumours can be benign or malignant.

- **Benign tumours** are not cancer. They often can be removed and, in most cases, they do not come back. Cells in benign tumours do not spread to other parts of the body. Most important, benign tumours are rarely a threat to life.
- **Malignant tumours** are cancer. Cells in malignant tumours are abnormal and divide without control or order. These cancer cells can invade and destroy the tissue around them. Also, cancer cells can break away from a malignant tumour and enter the bloodstream or lymphatic system. This process is how cancer spreads from the original (primary) tumour to form new tumours in other parts of the body. The spread of cancer is called metastases.

## Kidney Cancer

Several types of cancer can develop in the kidney. The information here will discuss renal cell cancer, the most common form of kidney cancer in adults. Transitional cell cancer (carcinoma), which affects the renal pelvis, is a less common form of kidney cancer. It is similar to cancer that occurs in the bladder and is often treated like bladder cancer. Wilms' tumour, the most common type of childhood kidney cancer, is different from kidney cancer in adults.

## Possible Causes and Prevention

Scientists at hospitals and medical centres are studying kidney cancer. They are trying to learn what causes this disease and how to prevent it. At this time, scientists do not know exactly what causes kidney cancer, and they can seldom explain why one person gets this disease and another does not. However, it is clear that this disease is not contagious; no one can "catch" kidney cancer from another person.

Researchers study patterns of cancer in the population to look for factors that are more common in people who get kidney cancer than in people who don't get this disease. These

studies help researchers find possible risk factors for kidney cancer. It is important to know that most people with these risk factors do not get cancer, and people who do get kidney cancer may have none of these factors.

As with most other types of cancer, studies show that the risk of kidney cancer increases with age. It occurs most often between the ages of 50 and 70. It affects almost twice as many men as women.

Other risk factors for kidney cancer include:

- **Tobacco use:** Research shows that smokers are twice as likely to develop kidney cancer as nonsmokers. In addition, the longer a person smokes, the higher the risk. However, the risk of kidney cancer decreases for those who quit smoking.
- **Obesity:** Obesity may increase the risk of developing kidney cancer. In several studies, obesity has been associated with increased risk in women. One report suggests that being overweight may be a risk factor for men, too. The reasons for this possible link are not clear.
- **Occupational exposure:** A number of studies have examined occupational exposures to see whether they increase workers' chances of developing kidney cancer. Studies suggest, for example, that coke oven workers in steel plants have above-average rates of kidney cancer. In addition, there is some evidence that asbestos in the workplace, which has been linked to cancers of the lung and mesothelium (a membrane that surrounds internal organs of the body), also increases the risk of some kidney cancers.
- **Radiation:** Women who have been treated with radiation therapy for disorders of the uterus may have a slightly increased risk of developing kidney cancer. Also, people who were exposed to thorotrast (thorium dioxide), a radioactive substance used in the 1920s with certain diagnostic x-rays, have an increased rate of kidney cancer. However, this substance is no longer in use, and scientists think that radiation accounts for an extremely small percentage of the total number of kidney cancers.
- **Dialysis:** Patients on long-term use of dialysis to treat chronic kidney failure have an increased risk of developing renal cysts and renal cancer. Further study is needed to learn more about the long-term effects of dialysis on patients with kidney failure.
- **Von Hippel-Lindau (VHL) disease:** Researchers have found that people who have this inherited disorder are at greater risk of developing renal cell carcinoma, as well as tumours in other organs. Researchers have found the gene responsible for VHL, and they believe that the isolation of this gene may lead to improved methods of diagnosis, treatment, and even prevention of some kidney cancers. People who think they may be at risk for developing kidney cancer should discuss this concern with their doctor. The doctor may suggest ways to reduce the risk and help plan an appropriate schedule for checkups.

## Symptoms

In its early stages, kidney cancer usually causes no obvious signs or troublesome symptoms. However, as a kidney tumour grows, symptoms may occur. These may include:

- **Blood in the urine.** Blood may be present one day and not the next. In some cases, a person can actually see the blood, or traces of it may be found in urinalysis, a lab test often performed as part of a regular medical checkup.

- A lump or mass in the kidney area.  
Other less common symptoms may include:
- Fatigue;
- Loss of appetite;
- Weight loss;
- Recurrent fevers;
- A pain in the side that doesn't go away; and/or
- A general feeling of poor health.

High blood pressure or a lower than normal number of red cells in the blood (anaemia) may also signal a kidney tumour; however, these symptoms occur less often.

These symptoms may be caused by cancer or by other, less serious problems such as an infection or a cyst. Only a doctor can make diagnoses. People with any of these symptoms may see their family doctor or an urologist, a doctor who specializes in diseases of the urinary system. Usually, early cancer does not cause pain; it is important not to wait to feel pain before seeing a doctor. In most cases, the earlier cancer is diagnosed and treated, the better a person's chance for a full recovery.

## Diagnosis

To find the cause of symptoms, the doctor asks about the patient's medical history and does a physical examination. In addition to checking for general signs of health, the doctor may perform blood and urine tests. The doctor may also carefully feel the abdomen for lumps or irregular masses.

The doctor usually orders tests that produce pictures of the kidneys and nearby organs.

These pictures can often show changes in the kidney and surrounding tissue. For example, an IVP (intravenous pyelogram) is a series of x-rays of the kidneys, ureters, and bladder after the injection of a dye. The dye may be placed in the body through a needle or a narrow tube called a catheter. The pictures produced can show changes in the shape of these organs and nearby lymph nodes.

Another test, arteriography, is a series of x-rays of the blood vessels. Dye is injected into a large blood vessel through a catheter. X-rays show the dye as it moves through the network of smaller blood vessels in and around the kidney.

Other imaging tests may include CT scan, MRI and ultrasonography, which can show the difference between diseased and healthy tissues.

If test results suggest that kidney cancer may be present, a biopsy may be performed; it is the only sure way to diagnose cancer. During a biopsy for kidney cancer, a thin needle is inserted into the tumour and a sample of tissue is withdrawn. A pathologist then examines the tissue under a microscope to check for cancer cells.

Once kidney cancer is diagnosed, the doctor will want to learn the stage, or extent, of the disease. Staging is a careful attempt to find out whether the cancer has spread and, if so, what parts of the body are affected. This information is needed to plan a patient's treatment. To stage kidney cancer, the doctor may use additional MRI and x-ray studies of the tissues and blood vessels in and around the kidney. The doctor can check for swollen lymph nodes in the chest and abdomen through CT scans. Chest x-rays can often show whether cancer has spread to the lungs. Bone scans reveal changes that may be a sign that the cancer has spread to the bones.

A person who needs a biopsy may want to ask the doctor some of the following questions:

- How long will it take? Will I be awake? Will it hurt?
- How soon will I know the results?
- If I do have cancer, who will talk with me about treatment? When?

## Treatment

Treatment for kidney cancer depends on the stage of the disease, the patient's general health and age, and other factors. The doctor develops a treatment plan to fit each patient's needs. A team of specialists, which may include an urologist, an oncologist and a radiation oncologist, often treats people with kidney cancer. Kidney cancer is usually treated with surgery, radiation therapy, biological therapy, chemotherapy, or hormone therapy. Sometimes a special treatment called arterial embolisation is used. The doctors may decide to use one treatment method or a combination of methods. Some people take part in a clinical trial (research study) using new treatment methods. Such studies are designed to improve cancer treatment.

### Getting a Second Opinion

- Before starting treatment, the patient may want a second pathologist to review the diagnosis and another specialist to review the treatment plan. A short delay will not reduce the chance that treatment will be successful.

### Preparing for Treatment

Many people with cancer want to learn all they can about their disease and their treatment choices so they can take an active part in decisions about their medical care. When a person is diagnosed with cancer, shock and stress are natural reactions. These feelings may make it difficult for patients to think of everything they want to ask the doctor. Often, it helps to make a list of questions. To help remember what the doctor says, people may take notes or ask whether they may use a tape recorder. Some patients also want to have a family member or friend with them when they talk to the doctor -- to take part in the discussion, to take notes, or just to listen. These are some questions a patient may want to ask the doctor before treatment begins:

- What type of kidney cancer do I have?
- What is the stage of the disease?
- What are the treatment choices? Which do you recommend? Why?
- What are the risks and possible side effects of each treatment?
- What are the chances that the treatment will be successful?
- What new treatments are being studied in clinical trials? Would a clinical trial be appropriate?
- How long will treatment last?
- Will I have to stay in the hospital?
- Will treatment affect my normal activities? If so, for how long?
- What is the treatment likely to cost?

People do not need to ask all their questions or remember all the answers at one time. Questions may arise throughout the treatment process. Patients may wish to ask doctors, nurses, or other members of the health care team to explain things further or to provide more information.

## Methods of Treatment

Surgery is the most common treatment for kidney cancer. An operation to remove the kidney is called a nephrectomy. Most often, the surgeon removes the whole kidney along with the adrenal gland and the tissue around the kidney. Some lymph nodes in the area may also be removed. This procedure is called a radical nephrectomy. In some cases, the surgeon removes only the kidney (simple nephrectomy). The remaining kidney generally is able to perform the work of both kidneys. In another procedure, partial nephrectomy, the surgeon removes just the part of the kidney that contains the tumour.

Arterial embolisation is sometimes used before an operation to make surgery easier. It also may be used to provide relief from pain or bleeding when removal of the tumor is not possible. Small pieces of a special gelatin sponge or other material are injected through a catheter to clog the main renal blood vessel. This procedure shrinks the tumour by depriving it of the oxygen-carrying blood and other substances it needs to grow.

These are some questions a patient may want to ask the doctor before surgery:

- What kind of operation will it be?
- Will further treatment be necessary? What kind?
- How will I feel after the operation?
- If I have pain, how will you help?
- When will I be able to resume my normal activities?

**Radiation therapy** (also called radiotherapy) uses high-energy rays to kill cancer cells. Doctors sometimes use radiation therapy to relieve pain when kidney cancer has spread to the bone.

Radiation therapy for kidney cancer involves external radiation, which comes from radioactive material outside the body. A machine aims the rays at a specific area of the body. Most often, treatment is given on an outpatient basis in a hospital or clinic 5 days a week for several weeks. This schedule helps protect normal tissue by spreading out the total dose of radiation. The patient does not need to stay in the hospital for radiation therapy, and patients are not radioactive during or after treatment.

These are some questions a patient may want to ask the doctor before having radiation therapy:

- What is the goal of this treatment?
- When will the treatments begin? When will they end?
- How will I feel during therapy? What are the possible side effects?
- What can I do to take care of myself during therapy?
- How will I know if the radiation therapy is working?
- Will I be able to continue my normal activities during treatment?

Surgery and arterial embolization are local therapy; they affect cancer cells only in the treated area. Biological therapy, chemotherapy, and hormone therapy, explained below, are systemic treatments because they travel through the bloodstream and can reach cells throughout the body.

**Biological therapy** (also called immunotherapy) is a form of treatment that uses the body's

natural ability (immune system) to fight cancer. Clinical trials continue to examine better ways to use biological therapy while reducing the side effects patients may experience. Many people having biological therapy stay in the hospital during treatment so that these side effects can be monitored.

These are some questions patients may want to ask the doctor before starting biological therapy:

- What is the goal of the treatment?
- What drugs will be used?
- Will the treatment cause side effects? If so, what can be done about them?
- Will I have to be in the hospital to receive treatment?
- When will I be able to resume my normal activities?

**Chemotherapy** is the use of drugs to kill cancer cells. Although useful in the treatment of many other cancers, chemotherapy has shown only limited effectiveness against kidney cancer. However, researchers continue to study new drugs and new drug combinations that may prove to be more useful.

**Hormone therapy** is used in a small number of patients with advanced kidney cancer. Some kidney cancers may be treated with hormones to try to control the growth of cancer cells. More often, it is used as palliative therapy.

These are some questions a patient may want to ask the doctor before having chemotherapy or hormone therapy:

- What is the goal of this treatment?
- What drugs will I be taking?
- Will I have side effects? What can I do about them?
- How long will I be on the treatment?

### Clinical Trials

Many people with kidney cancer take part in clinical trials (treatment studies). Doctors conduct clinical trials to learn about the effectiveness and side effects of new treatments. In some clinical trials, all patients receive the new treatment. In other trials, doctors compare different therapies by giving the new treatment to one group of patients and the standard therapy to another group.

People who take part in these studies have the first chance to benefit from treatments that have shown promise in early research. They also make an important contribution to medical science.

In clinical trials for kidney cancer, doctors are studying new ways of giving radiation therapy and chemotherapy, new drugs and drug combinations, biological therapies, and new ways of combining various types of treatment. Some trials are designed to study ways to reduce the side effects of treatment and to improve quality of life.

### Side Effects of Treatment

It is hard to limit the effects of therapy so that only cancer cells are removed or destroyed. Because treatment also damages healthy cells and tissues, it often causes unwanted side effects.

The side effects of cancer therapy depend mainly on the type and extent of the treatment. Also, side effects may not be the same for each person, and they may even change from one treatment to the next. Doctors and nurses can explain the possible side effects of therapy, and they can help relieve problems that may occur during and after treatment. Patients should notify a doctor of the side effects they are having, as some may require immediate medical attention.

### Surgery

The side effects of kidney surgery depend on the type of operation, the patient's general health, and other factors. Nephrectomy is major surgery, and after the operation most people have pain and discomfort. Patients may find it difficult to breathe deeply due to discomfort from surgery; they may have to do special coughing and breathing exercises to help keep their lungs clear. It is also common for patients who have had surgery to feel tired or weak for a while.

In addition, patients may need intravenous feeding and fluids for several days before and after the operation. When a kidney is removed, the one remaining kidney takes over the work of both. Nurses will monitor the amount of fluid a person takes in and the amount of urine produced. The length of time it takes to recover from an operation varies for each person.

### Arterial Embolisation

Arterial embolisation can cause pain, fever, nausea, or vomiting. Often, people need IV fluids as the body recovers from this procedure.

### Radiation Therapy

With radiation therapy, the side effects depend on the treatment dose and the part of the body that is treated. Patients are likely to become very tired, especially in the later weeks of treatment. Resting is important, but doctors usually advise patients to try to stay as active as they can.

It is common for the skin in the treated area to become red, dry, tender, and itchy. There may be permanent darkening or "bronzing" of the skin in the treated area. Radiation to the kidney and nearby areas may cause nausea, vomiting, diarrhoea, or urinary discomfort. It may also cause a decrease in the number of white blood cells; cells that help protect the body against infection.

### Biological Therapy

The side effects caused by biological therapy vary with the type of treatment. These treatments may cause flu-like symptoms such as chills, fever, muscle aches, weakness, and loss of appetite, nausea, vomiting, and diarrhoea. Patients often feel very tired after treatment, and they may bleed or bruise easily. Some people also get a skin rash. In addition, interleukin therapy can cause swelling and can interfere with normal liver or kidney function. These problems can be severe, but they go away after the treatment stops.

### Chemotherapy

The side effects of chemotherapy depend on the drugs that are given. In general, anticancer drugs affect rapidly growing cells, such as blood cells that fight infection, cells that line the digestive tract, and cells in the hair follicles. As a result, patients may have side effects such as lower resistance to infection, loss of appetite, nausea, vomiting, or mouth sores. They may also have less energy and may lose their hair.

### Hormone Therapy

The side effects of hormone therapy are usually mild. Progesterone is the hormone most often used to treat kidney cancer. Drugs containing progesterone may cause changes in appetite and weight. They may also cause swelling or fluid retention. These side effects generally go away after treatment.

### Nutrition for Cancer Patients

Eating well during cancer treatment means getting enough calories and protein to help

prevent weight loss and regain strength. Patients who eat well often feel better and have more energy. Some people find it hard to eat well during treatment for kidney cancer. They may lose their appetite. In addition to loss of appetite, common side effects of treatment, such as nausea, vomiting, or mouth sores, can make eating difficult. For some people, food tastes different. Also, people may not feel like eating when they are uncomfortable or tired. Doctors, nurses, and dieticians can offer advice for healthy eating during cancer treatment. The Resource and Wellness Centre have a resident dietician. Please call 03 2698 7300 or email [contact@cancer.org.my](mailto:contact@cancer.org.my) for an appointment.

### Follow up Care

Regular follow up by the doctor is important after treatment for kidney cancer. The doctor will suggest appropriate follow up that may include a physical examination, chest x-rays, and laboratory tests. The doctor sometimes orders scans and other tests. Patients should continue to have follow up visits. They should also report any problem as soon as it appears.

## Support for Cancer Patients

Living with a serious illness is not easy. People with cancer and those who care about them face many problems and challenges. Coping with these problems is often easier when people have helpful information and support services

Friends and relatives can be very supportive. Also, it helps many people to discuss their concerns with others who have or have had cancer. Cancer patients often get together in support groups, where they can share what they have learned about coping with cancer and the effects of treatment. It is important to keep in mind, however, that each person is different. Treatments and ways of dealing with cancer that work for one person may not be right for another -- even if they both have the same kind of cancer. It is always a good idea to discuss the advice of friends and family members with the doctor.

People living with cancer may worry about the future. They may worry about holding their job, caring for their family, or keeping up with daily activities. Concerns about tests, treatments, hospital stays, and medical bills are also common. Doctors, nurses, and other members of the health care team can answer questions about treatment, working, or other activities.

For further support contact the Resource and Wellness Centre on 03 2698 7300 or email [contact@cancer.org.my](mailto:contact@cancer.org.my)

### What the Future Holds

People with kidney cancer and their families are naturally concerned about what the future holds. Sometimes they use statistics to try to figure out the chances of being cured. It is important to remember, however, that statistics are averages based on large numbers of people. They cannot be used to predict what will happen to a particular person because no two people are alike; treatments and responses vary greatly. The doctor who takes care of the patient is in the best position to talk with the patient about the chance of recovery.

The outlook for people with early stage kidney cancer is positive. Kidney cancer is often cured if it is found and treated before it has spread. Many researchers are trying to find better ways to detect kidney cancer at an early stage. They are also continuing to look for new and better ways to treat advanced kidney cancer.

When doctors talk about surviving cancer, they may use the term remission rather than cure. Although many kidney cancer patients are cured, doctors use this term because the disease can return. (The return of cancer after treatment is called a recurrence.)

## Cancer Glossary Terms

### abdomen

The area of the body that contains the pancreas, stomach, intestine, liver, gallbladder, and other organs.

### adrenal glands

A pair of small glands, one located on top of each kidney. They produce steroid hormones, adrenaline and noradrenaline, which help control heart rate, blood pressure, and other important body functions.

### anaemia

A condition in which the number of red blood cells is below normal.

### arterial embolisation

The blocking of an artery by a clot of foreign material. This can be done as treatment to block the flow of blood to a tumour.

### arteriography

A procedure to x-ray arteries. The arteries can be seen because of an injection of a dye that outlines the vessels on an x-ray.

### benign

Not cancerous; does not invade nearby tissue or spread to other parts of the body.

### biological therapy

Treatment to stimulate or restore the ability of the immune system to fight infection and disease. Some biological therapy agents may act directly on cancer cells to block their growth. Also used to lessen side effects that may be caused by some cancer treatments. Also known as immunotherapy, biotherapy, or biological response modifier (BRM) therapy.

### biopsy

The removal of cells or tissues for examination under a microscope. When only a sample of tissue is removed, the procedure is called an incisional biopsy or core biopsy. When an entire lump or suspicious area is removed, the procedure is called an excisional biopsy. When a sample of tissue or fluid is removed with a needle, the procedure is called a needle biopsy or fine-needle aspiration.

### bladder

The organ that stores urine.

### cancer

A term for diseases in which abnormal cells divide without control. Cancer cells can invade nearby tissues and can spread through the bloodstream and lymphatic system to other parts of the body.

### catheter

A flexible tube used to deliver fluids into or withdraw fluids from the body.

### chemotherapy

Treatment with anticancer drugs.

### CT Scan

Computed tomography scan. A series of detailed pictures of areas inside the body taken from different angles; the pictures are created by a computer linked to an x-ray machine. Also called computerized tomography and computerized axial tomography (CAT) scan.

### cyst

A sac or capsule filled with fluid.

### external radiation

Radiation therapy that uses a machine to aim high-energy rays at the cancer. Also called external-beam radiation.

### gene

The functional and physical unit of heredity passed from parent to offspring. Genes are pieces of DNA, and most genes contain the information for making a specific protein.

### hair follicles

Shafts or openings on the surface of the skin through which hair grows.

### hormone therapy

Treatment that adds, blocks, or removes hormones. For certain conditions (such as diabetes or menopause), hormones are given to adjust low hormone levels. To slow or stop the growth of certain cancers (such as prostate and breast cancer), hormones may be given to block the body's natural hormones. Sometimes surgery is needed to remove the source of hormones. Also called hormonal therapy, hormone treatment, or endocrine therapy.

### hormones

Chemicals produced by glands in the body and circulated in the bloodstream. Hormones control the actions of certain cells or organs.

### immune system

The complex group of organs and cells that defends the body against infection or disease.

### intravenous

IV. Within a blood vessel. Intravenous. Injected into a blood vessel.

### IVP

Intravenous pyelogram or intravenous. A series of x-rays of the kidneys, ureters, and bladder. The x-rays are taken after a dye is injected into a blood vessel. The dye is concentrated in the urine, which outlines the kidneys, ureters, and bladder on the x-rays.

### kidneys

A pair of organs in the abdomen that remove waste from the blood (as urine), produce erythropoietin (a substance that stimulates red blood cell production), and play a role in blood pressure regulation.

### local therapy

Treatment that affects cells in the tumour and the area close to it.

### lymph node

A rounded mass of lymphatic tissue that is surrounded by a capsule of connective tissue. Lymph nodes filter lymph (lymphatic fluid), and they store lymphocytes (white blood cells). They are located along lymphatic vessels. Also called a lymph gland.

### lymphatic system

The tissues and organs that produce, store, and carry white blood cells that fight infection and other diseases. This system includes the bone marrow, spleen, thymus, lymph nodes, and lymphatic vessels (a network of thin tubes that carry lymph and white blood cells). These tubes branch, like blood vessels, into all the tissues of the body.

### malignant

Cancerous; a growth with a tendency to invade and destroy nearby tissue and spread to other parts of the body.

### metastasis

The spread of cancer from one part of the body to another. Tumours formed from cells that have spread are called "secondary tumours" and contain cells that are like those in the original (primary) tumour. The plural is metastases.

### MRI

Magnetic resonance imaging . A procedure in which a magnet linked to a computer is used to create detailed pictures of areas inside the body. Also called nuclear magnetic resonance imaging (NMRI).

### nephrectomy

Surgery to remove a kidney. Radical nephrectomy removes the kidney, the adrenal gland, nearby lymph nodes, and other surrounding tissue. Simple nephrectomy removes only the kidney. Partial nephrectomy removes the tumour but not the entire kidney.

### oncologist

A doctor who specialises in treating cancer. Some oncologists specialize in a particular type of cancer treatment. For example, a radiation oncologist specializes in treating cancer with radiation.

### palliative therapy

Treatment given to relieve symptoms caused by advanced cancer. Palliative therapy does not alter the course of a disease but can improve the quality of life.

### pathologist

A doctor who identifies diseases by studying cells and tissues under a microscope.

### progesterone

A female hormone.

### prognosis

The likely outcome or course of a disease; the chance of recovery or recurrence.

### radiation oncologist

A doctor who specializes in using radiation to treat cancer.

### radiation therapy

The use of high-energy radiation from x-rays, gamma rays, neutrons, and other sources to kill cancer cells and shrink tumours. Radiation may come from a machine outside the body (external-beam radiation therapy), or from materials called radioisotopes. Radioisotopes produce radiation and can be placed in or near the tumour or in the area near cancer cells. This type of radiation treatment is called internal radiation therapy, implant radiation, interstitial radiation, or brachytherapy. Systemic radiation therapy uses a radioactive substance, such as a radiolabeled monoclonal antibody, that circulates throughout the body. Also called radiotherapy, irradiation, and x-ray therapy.

### red blood cells

RBCs. Cells that carry oxygen to all parts of the body. Also called erythrocytes.

### remission

A decrease in or disappearance of signs and symptoms of cancer. In partial remission, some, but not all, signs and symptoms of cancer have disappeared. In complete remission, all signs and symptoms of cancer have disappeared, although there still may be cancer in the body.

### renal cell cancer

Cancer that develops in the lining of the renal tubules, which filter the blood and produce urine.

### risk factor

Anything that increases a person's chance of developing a disease, including a substance, agent, genetic alteration, trait, habit, or condition.

### side effects

Problems that occur when treatment affects tissues or organs other than the ones meant to be affected by the treatment. Common side effects of cancer treatment are fatigue, pain, nausea, vomiting, decreased blood cell counts, hair loss, and mouth sores.

### stage

The extent of a cancer within the body, especially whether the disease has spread from the original site to other parts of the body.

### surgery

A procedure to remove or repair a part of the body or to find out whether disease is present. An operation.

### systemic

Affecting the entire body.

### tissue

A group or layer of cells that are alike and that work together to perform a specific function.

### transitional cell carcinoma

A type of cancer that develops in the lining of the bladder, ureter, or renal pelvis.

### Tumour

An abnormal mass of tissue that results from excessive cell division. Tumours perform no useful body function. They may be benign (not cancerous) or malignant (cancerous).

### ultrasonography

A procedure in which sound waves (called ultrasound) are bounced off tissues and the echoes produce a picture (sonogram).

### ureter

The tube that carries urine from the kidney to the bladder.

### urethra

The tube through which urine leaves the body. It empties urine from the bladder.

### urinalysis

A test that determines the content of the urine.

### urinary tract

The organs of the body that produce and discharge urine. These include the kidneys, ureters, bladder, and urethra.

### urine

Fluid containing water and waste products. Urine is made by the kidneys, stored in the bladder, and leaves the body through the urethra.

### urologist

A doctor who specializes in diseases of the urinary organs in females and the urinary and sex organs in males.

### white blood cell

WBC. Refers to a blood cell that does not contain haemoglobin. White blood cells include lymphocytes, neutrophils, eosinophils, macrophages, and mast cells. These cells are made by bone marrow and help the body fight infection and other diseases.

### x-ray

A type of high-energy radiation. In low doses, x-rays are used to diagnose diseases by making pictures of the inside of the body. In high doses, x-rays are used to treat cancer.