
# What You Need To Know About™

# Bladder Cancer



NATIONAL INSTITUTES OF HEALTH
National Cancer Institute

This booklet is about bladder cancer. The Cancer Information Service can help you learn more about this disease. The staff can talk with you in English or Spanish.

The number is 1–800–4–CANCER (1–800–422–6237). The number for deaf and hard of hearing callers with TTY equipment is 1–800–332–8615. The call is free.

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Este folleto es acerca del cáncer de la vejiga. Llame al Servicio de Información sobre el Cáncer para saber más sobre esta enfermedad. Este servicio tiene personal que habla español.

El número a llamar es el 1–800–4–CANCER (1–800–422–6237). Personas con dificultades de audición y que cuentan con equipo TTY pueden llamar al 1–800–332–8615. La llamada es gratis.

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U.S. DEPARTMENT OF HEALTH AND
HUMAN SERVICES
Public Health Service
National Institutes of Health

# What You Need To Know About™ Bladder Cancer

This National Cancer Institute (NCI) booklet has important information about *cancer** of the bladder. Each year in the United States, bladder cancer is diagnosed in 38,000 men and 15,000 women. This is the fourth most common type of cancer in men and the eighth most common in women.

This booklet discusses possible causes, symptoms, diagnosis, treatment, and rehabilitation. It also has information to help patients cope with bladder cancer.

Research is increasing what we know about bladder cancer. Scientists are learning more about its causes. They are exploring new ways to prevent, detect, diagnose, and treat this disease. Because of research, people with bladder cancer have an improved quality of life and less chance of dying from this disease.

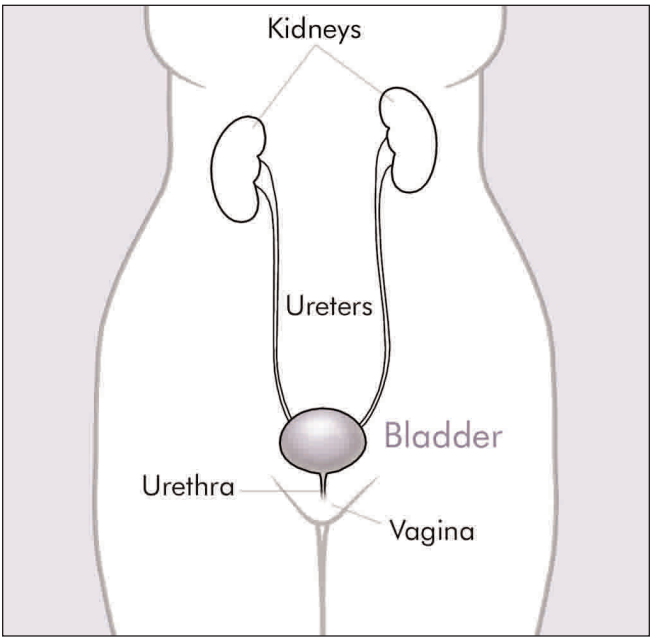
Information specialists at the NCI's Cancer Information Service can answer callers' questions about cancer and can send NCI publications. The number to call is 1–800–4–CANCER. Also, anyone may view or order NCI publications on the Internet at **http://cancer.gov/publications**.

*Words that may be new to readers appear in *italics*. The "Dictionary" section gives definitions of these terms. Some words in the "Dictionary" have a "sounds-like" spelling to show how to pronounce them.

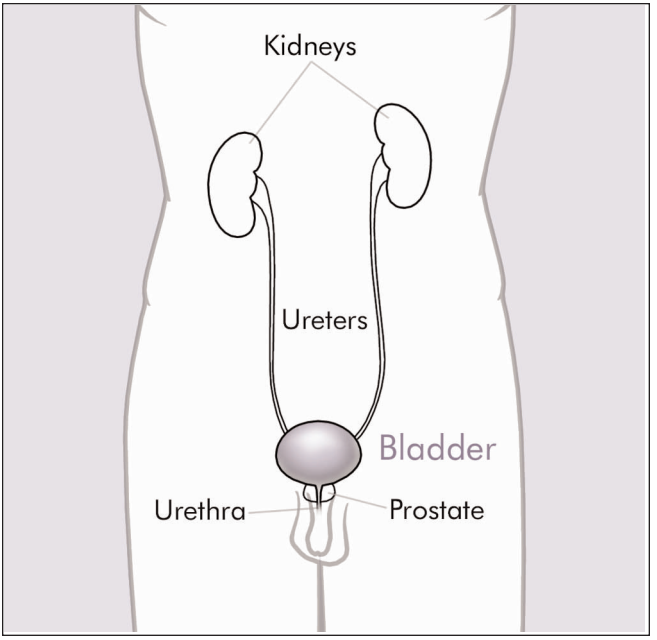
## The Bladder

The *bladder* is a hollow organ in the lower *abdomen*. It stores *urine*, the liquid waste produced by the *kidneys*. Urine passes from each kidney into the bladder through a tube called a *ureter*.

An outer layer of muscle surrounds the inner lining of the bladder. When the bladder is full, the muscles in the bladder wall can tighten to allow urination. Urine leaves the bladder through another tube, the *urethra*.




Female Urinary Tract




Male Urinary Tract

## Understanding Cancer

Cancer is a group of many related diseases. All cancers begin in cells, the body's basic unit of life. Cells make up *tissues*, and tissues make up the organs of the body.

Normally, cells grow and divide to form new cells as the body needs them. When cells grow old and die, new cells take their place.

Sometimes this orderly process goes wrong. New cells form when the body does not need them, and old

cells do not die when they should. These extra cells can form a mass of tissue called a growth or *tumor*.

Tumors can be *benign* or *malignant*:

- **Benign tumors** are not cancer. Usually, doctors can remove them. Cells from benign tumors do not spread to other parts of the body. In most cases, benign tumors do not come back after they are removed. Most important, benign tumors are rarely a threat to life.
- **Malignant tumors** are cancer. They are generally more serious. Cancer cells can invade and damage nearby tissues and organs. Also, cancer cells can break away from a malignant tumor and enter the bloodstream or *lymphatic system*. That is how cancer cells spread from the original (primary) tumor to form new tumors in other organs. The spread of cancer is called *metastasis*.

The wall of the bladder is lined with cells called *transitional cells* and *squamous cells*. More than 90 percent of bladder cancers begin in the transitional cells. This type of bladder cancer is called *transitional cell carcinoma*. About 8 percent of bladder cancer patients have *squamous cell carcinomas*.

Cancer that is only in cells in the lining of the bladder is called *superficial* bladder cancer. The doctor might call it *carcinoma in situ*. This type of bladder cancer often comes back after treatment. If this happens, the disease most often *recurs* as another superficial cancer in the bladder.

Cancer that begins as a superficial tumor may grow through the lining and into the muscular wall of the bladder. This is known as *invasive cancer*. Invasive cancer may extend through the bladder wall. It may grow into a nearby organ such as the *uterus* or *vagina*

(in women) or the *prostate* (in men). It also may invade the wall of the abdomen.

When bladder cancer spreads outside the bladder, cancer cells are often found in nearby *lymph nodes*. If the cancer has reached these nodes, cancer cells may have spread to other lymph nodes or other organs, such as the lungs, liver, or bones.

When cancer spreads (*metastasizes*) from its original place to another part of the body, the new tumor has the same kind of abnormal cells and the same name as the *primary tumor*. For example, if bladder cancer spreads to the lungs, the cancer cells in the lungs are actually bladder cancer cells. The disease is metastatic bladder cancer, not lung cancer. It is treated as bladder cancer, not as lung cancer. Doctors sometimes call the new tumor "distant" disease.

## Bladder Cancer: Who's at Risk?

No one knows the exact causes of bladder cancer. However, it is clear that this disease is not contagious. No one can "catch" cancer from another person.

People who get bladder cancer are more likely than other people to have certain *risk factors*. A risk factor is something that increases a person's chance of developing the disease.

Still, most people with known risk factors do not get bladder cancer, and many who do get this disease have none of these factors. Doctors can seldom explain why one person gets this cancer and another does not.

Studies have found the following risk factors for

bladder cancer:

- **Age.** The chance of getting bladder cancer goes up as people get older. People under 40 rarely get this disease.
- **Tobacco.** The use of tobacco is a major risk factor. Cigarette smokers are two to three times more likely than nonsmokers to get bladder cancer. Pipe and cigar smokers are also at increased risk.
- **Occupation.** Some workers have a higher risk of getting bladder cancer because of *carcinogens* in the workplace. Workers in the rubber, chemical, and leather industries are at risk. So are hairdressers, machinists, metal workers, printers, painters, textile workers, and truck drivers.
- **Infections.** Being infected with certain *parasites* increases the risk of bladder cancer. These parasites are common in tropical areas but not in the United States.
- **Treatment with *cyclophosphamide* or *arsenic*.** These drugs are used to treat cancer and some other conditions. They raise the risk of bladder cancer.
- **Race.** Whites get bladder cancer twice as often as African Americans and Hispanics. The lowest rates are among Asians.
- **Being a man.** Men are two to three times more likely than women to get bladder cancer.
- **Family history.** People with family members who have bladder cancer are more likely to get the disease. Researchers are studying changes in certain *genes* that may increase the risk of bladder cancer.
- **Personal history of bladder cancer.** People who have had bladder cancer have an increased chance of getting the disease again.

*Chlorine* is added to water to make it safe to drink.

It kills deadly *bacteria*. However, chlorine by-products sometimes can form in chlorinated water. Researchers have been studying chlorine by-products for more than 25 years. So far, there is no proof that chlorinated water causes bladder cancer in people. Studies continue to look at this question.

Some studies have found that saccharin, an artificial sweetener, causes bladder cancer in animals. However, research does not show that saccharin causes cancer in people.

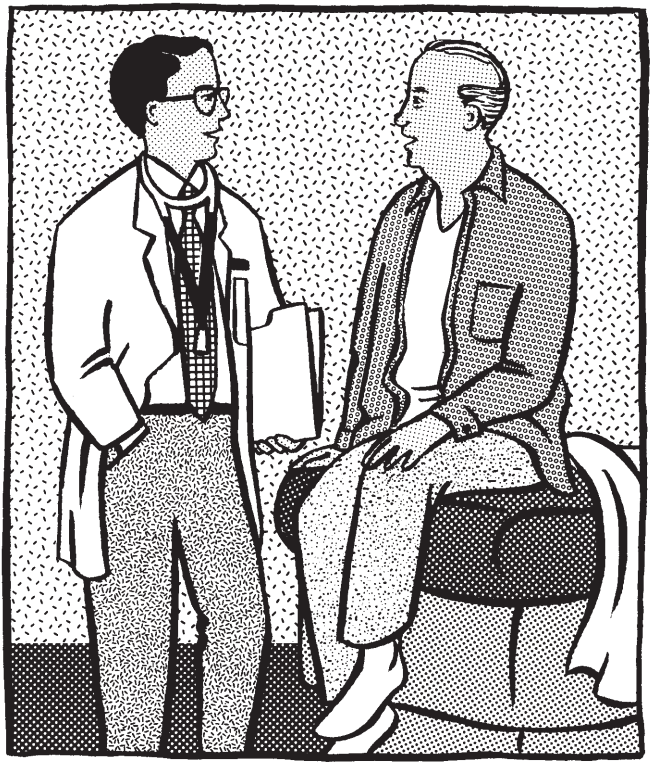
People who think they may be at risk for bladder cancer should discuss this concern with their doctor. The doctor may suggest ways to reduce the risk and can plan an appropriate schedule for checkups.

## Symptoms

Common *symptoms* of bladder cancer include:

- Blood in the urine (making the urine slightly rusty to deep red),
- Pain during urination, and
- Frequent urination, or feeling the need to urinate without results.

These symptoms are not sure signs of bladder cancer. Infections, benign tumors, bladder stones, or other problems also can cause these symptoms. Anyone with these symptoms should see a doctor so that the doctor can diagnose and treat any problem as early as possible. People with symptoms like these may see their family doctor or a *urologist*, a doctor who specializes in diseases of the urinary system.



## Diagnosis

If a patient has symptoms that suggest bladder cancer, the doctor may check general signs of health and may order lab tests. The person may have one or more of the following procedures:

- **Physical exam**–The doctor feels the abdomen and *pelvis* for tumors. The physical exam may include a *rectal* or *vaginal* exam.
- **Urine tests**–The laboratory checks the urine for blood, cancer cells, and other signs of disease.

- ***Intravenous pyelogram***– The doctor injects dye into a blood vessel. The dye collects in the urine, making the bladder show up on *x-rays*.
- ***Cystoscopy***–The doctor uses a thin, lighted tube (*cystoscope*) to look directly into the bladder. The doctor inserts the cystoscope into the bladder through the urethra to examine the lining of the bladder. The patient may need *anesthesia* for this procedure.

  The doctor can remove samples of tissue with the cystoscope. A *pathologist* then examines the tissue under a microscope. The removal of tissue to look for cancer cells is called a *biopsy*. In many cases, a biopsy is the only sure way to tell whether cancer is present. For a small number of patients, the doctor removes the entire cancerous area during the biopsy. For these patients, bladder cancer is diagnosed and treated in a single procedure.

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

- Why do I need to have a biopsy?
- How long will it take? Will I be awake? Will it hurt?
- How soon will I know the results?
- Are there any risks? What are the chances of infection or bleeding after the biopsy?
- If I do have cancer, who will talk with me about treatment? When?

## Staging

If bladder cancer is diagnosed, the doctor needs to know the *stage*, or extent, of the disease to plan the best treatment. *Staging* is a careful attempt to find out whether the cancer has invaded the bladder wall, whether the disease has spread, and if so, to what parts of the body.

The doctor may determine the stage of bladder cancer at the time of diagnosis, or may need to give the patient more tests. Such tests may include *imaging* tests–*CT scan*, *magnetic resonance imaging* (*MRI*), *sonogram*, intravenous pyelogram, *bone scan*, or chest x-ray. Sometimes staging is not complete until the patient has *surgery*.

These are the main features of each stage of the disease:

- Stage 0–The cancer cells are found only on the surface of the inner lining of the bladder. The doctor may call this superficial cancer or carcinoma *in situ*.
- Stage I–The cancer cells are found deep in the inner lining of the bladder. They have not spread to the muscle of the bladder.
- Stage II–The cancer cells have spread to the muscle of the bladder.
- Stage III–The cancer cells have spread through the muscular wall of the bladder to the layer of tissue surrounding the bladder. The cancer cells may have spread to the prostate (in men) or to the uterus or vagina (in women).
- Stage IV–The cancer extends to the wall of the abdomen or to the wall of the pelvis. The cancer cells may have spread to lymph nodes and other parts of the body far away from the bladder, such as the lungs.

## Treatment

Many people with bladder cancer want to take an active part in decisions about their medical care. They want to learn all they can about their disease and their treatment choices. However, the shock and stress that people often feel after a diagnosis of cancer can make it hard for them to think of everything they want to ask the doctor. Often it helps to make a list of questions before an appointment. To help remember what the doctor says, patients 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.

The doctor may refer patients to doctors who specialize in treating cancer, or patients may ask for a referral. Treatment generally begins within a few weeks after the diagnosis. There will be time for patients to talk with the doctor about treatment choices, get a second opinion, and learn more about bladder cancer.

### Getting a Second Opinion

Before starting treatment, a patient may want to get a second opinion about the diagnosis, the stage of cancer, and the treatment plan. Some insurance companies require a second opinion; others may cover a second opinion if the patient requests it. Gathering medical records and arranging to see another doctor may take a little time. In most cases, a brief delay does not make treatment less effective.

There are a number of ways to find a doctor for a second opinion:

- The doctor may refer patients to one or more specialists. Specialists who treat bladder cancer

include *surgeons*, *urologists*, *medical oncologists*, *radiation oncologists*, and *urologic oncologists*. At cancer centers, these doctors often work together as a team.

- The Cancer Information Service, at 1–800–4–CANCER, can tell callers about treatment facilities, including cancer centers and other programs supported by the National Cancer Institute.
- People can get the names of specialists from their local medical society, a nearby hospital, or a medical school.
- The *Official ABMS Directory of Board Certified Medical Specialists* lists doctors' names along with their speciality and their educational background. This resource is available in most public libraries. The American Board of Medical Specialties (ABMS) also has telephone and Internet services. The public can use these services to check whether a physician is board certified. The telephone number is 1–866–ASK–ABMS (1–866–275–2267). The Internet address is **http://www.abms.org/newsearch.asp**.

## Preparing for Treatment

The doctor develops a treatment plan to fit each patient's needs. Treatment depends on the type of bladder cancer, the stage of the disease, and the *grade* of the tumor. (The grade tells how closely the cancer cells resemble normal cells. It suggests how fast the cancer is likely to grow. Low-grade cancers usually grow and spread more slowly than high-grade cancers.) The doctor also considers other factors, including the patient's age and general health.

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

- What kind of bladder cancer do I have?
- What is the stage of the disease? Has the cancer spread?
- What is the grade of the tumor?
- What are my treatment choices? Which do you recommend for me? Why?
- What are the expected benefits of each kind of treatment?
- What are the risks and possible *side effects* of each treatment?
- What is the treatment likely to cost? Is this treatment covered by my insurance plan?
- How will treatment affect my normal activities?

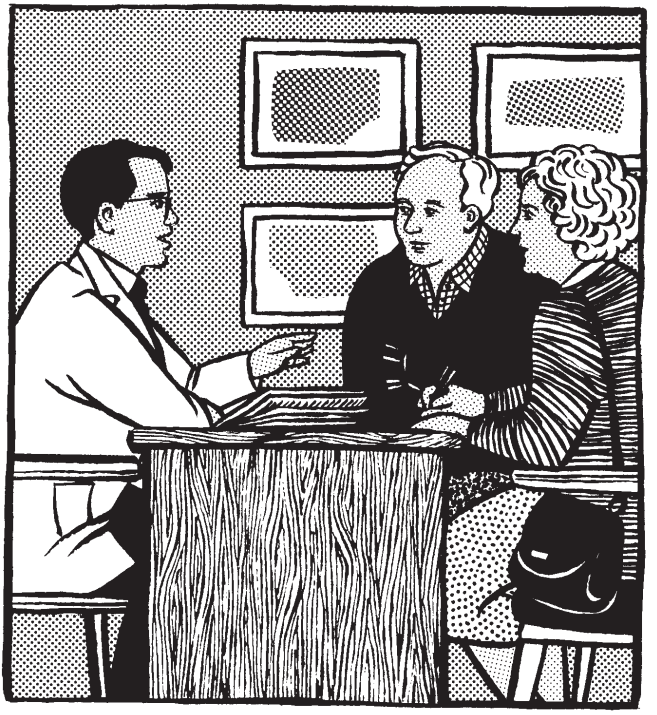
People do not need to ask all of their questions or understand all of the answers at once. They will have other chances to ask the doctor to explain things that are not clear and to ask for more information.

## Methods of Treatment

People with bladder cancer have many treatment options. They may have surgery, *radiation therapy*, *chemotherapy*, or *biological therapy*. Some patients get a combination of therapies.

The doctor is the best person to describe treatment choices and discuss the expected results of treatment.

A patient may want to talk to the doctor about taking part in a clinical trial, a research study of new treatment methods. *Clinical trials* are an important option for



people with all stages of bladder cancer. The section on "The Promise of Cancer Research" has more information about clinical trials.

**Surgery** is a common treatment for bladder cancer. The type of surgery depends largely on the stage and grade of the tumor. The doctor can explain each type of surgery and discuss which is most suitable for the patient:

- ***Transurethral resection***: The doctor may treat early (superficial) bladder cancer with transurethral resection (TUR). During TUR, the doctor inserts a cystoscope into the bladder through the urethra. The doctor then uses a tool with a small wire loop on the end to remove the cancer and to burn away any remaining cancer cells with an electric current. (This

is called *fulguration*.) The patient may need to be in the hospital and may need anesthesia. After TUR, patients may also have chemotherapy or biological therapy.

- ***Radical cystectomy***: For invasive bladder cancer, the most common type of surgery is radical cystectomy. The doctor also chooses this type of surgery when superficial cancer involves a large part of the bladder. Radical cystectomy is the removal of the entire bladder, the nearby lymph nodes, part of the urethra, and the nearby organs that may contain cancer cells. In men, the nearby organs that are removed are the prostate, *seminal vesicles*, and part of the *vas deferens*. In women, the uterus, *ovaries*, *fallopian tubes*, and part of the vagina are removed.
- ***Segmental cystectomy***: In some cases, the doctor may remove only part of the bladder in a procedure called segmental cystectomy. The doctor chooses this type of surgery when a patient has a low-grade cancer that has invaded the bladder wall in just one area.

Sometimes, when the cancer has spread outside the bladder and cannot be completely removed, the surgeon removes the bladder but does not try to get rid of all the cancer. Or, the surgeon does not remove the bladder but makes another way for urine to leave the body. The goal of the surgery may be to relieve urinary blockage or other symptoms caused by the cancer.

When the entire bladder is removed, the surgeon makes another way to collect urine. The patient may wear a bag outside the body, or the surgeon may create a pouch inside the body with part of the intestine. The sections on “Side Effects of Treatment” and “Rehabilitation” have more information about these procedures.

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

- What kind of operation will it be?
- How will I feel afterward?
- What will you do for me if I have pain?
- How long will I have to stay in the hospital?
- Will I have any long-term effects?
- When can I get back to my normal activities?
- Will I urinate in a normal way?
- Will the surgery affect my sex life?
- How often will I need checkups?

**Radiation therapy** (also called radiotherapy) uses high-energy rays to kill cancer cells. Like surgery, radiation therapy is local therapy. It affects cancer cells only in the treated area.

A small number of patients may have radiation therapy before surgery to shrink the tumor. Others may have it after surgery to kill cancer cells that may remain in the area. Sometimes, patients who cannot have surgery have radiation therapy instead.

Doctors use two types of radiation therapy to treat bladder cancer:

- ***External radiation***: A large machine outside the body aims radiation at the tumor area. Most people receiving external radiation are treated 5 days a week for 5 to 7 weeks as an outpatient. This schedule helps protect healthy cells and tissues by spreading out the total dose of radiation. Treatment may be shorter when external radiation is given along with radiation implants.

- ***Internal radiation***: The doctor places a small container of a *radioactive* substance into the bladder through the urethra or through an *incision* in the abdomen. The patient stays in the hospital for several days during this treatment. To protect others from radiation exposure, patients may not be able to have visitors or may have visitors for only a short period of time while the implant is in place. Once the implant is removed, no radioactivity is left in the body.

Some patients with bladder cancer receive both kinds of radiation therapy.

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

- Why do I need this therapy?
- How will the radiation be given?
- Will I need to stay in the hospital? For how long?
- When will the treatments begin? When will they end?
- How will I feel during therapy? Are there side effects?
- What can I do to take care of myself during treatment?
- How will we know if the radiation is working?
- Will I be able to continue my normal activities during treatment?
- How often will I need checkups?

**Chemotherapy** uses drugs to kill cancer cells. The doctor may use one drug or a combination of drugs.

For patients with superficial bladder cancer, the doctor may use *intravesical* chemotherapy after removing the cancer with TUR. This is local therapy. The doctor inserts a tube (*catheter*) through the urethra and puts liquid drugs in the bladder through the catheter. The drugs remain in the bladder for several hours. They mainly affect the cells in the bladder. Usually, the patient has this treatment once a week for several weeks. Sometimes, the treatments continue once or several times a month for up to a year.

If the cancer has deeply invaded the bladder or spread to lymph nodes or other organs, the doctor may give drugs through a vein. This treatment is called *intravenous* chemotherapy. It is *systemic therapy*, meaning that the drugs flow through the bloodstream to nearly every part of the body. The drugs are usually given in cycles so that a recovery period follows every treatment period.

The patient may have chemotherapy alone or combined with surgery, radiation therapy, or both. Usually chemotherapy is an outpatient treatment given at the hospital, clinic, or doctor's office. However, depending on which drugs are given and the patient's general health, the patient may need a short hospital stay.

**Biological therapy** (also called immunotherapy) uses the body's natural ability (*immune system*) to fight cancer. Biological therapy is most often used after TUR for superficial bladder cancer. This helps prevent the cancer from coming back.

The doctor may use intravesical biological therapy with *BCG solution*. BCG solution contains live, weakened bacteria. The bacteria stimulate the immune system to kill cancer cells in the bladder. The doctor

uses a catheter to put the solution in the bladder. The patient must hold the solution in the bladder for about 2 hours. BCG treatment is usually done once a week for 6 weeks.

Patients may want to ask these questions about chemotherapy or biological therapy:

- Why do I need this treatment?
- What drug will I get? How will it be given? What will it do?
- Will it cause side effects? What can I do about them?
- How long will I be on this treatment?
- How often will I need checkups?

## Side Effects of Treatment

Because cancer treatment may damage healthy cells and tissues, unwanted side effects sometimes occur. These side effects depend on many factors, including the type and extent of the treatment. Side effects may not be the same for each person, and they may even change from one treatment session to the next. Doctors and nurses will explain the possible side effects of treatment and how they will help the patient manage them.

The NCI provides helpful booklets about cancer treatments and coping with side effects, such as *Radiation Therapy and You*, *Chemotherapy and You*, and *Eating Hints for Cancer Patients*. See the "National Cancer Institute Information Resources" and

"National Cancer Institute Booklets" sections for other sources of information about side effects.

## Surgery

For a few days after TUR, patients may have some blood in their urine and difficulty or pain when urinating. Otherwise, TUR generally causes few problems.

After *cystectomy*, most patients are uncomfortable during the first few days. However, medicine can control the pain. Patients should feel free to discuss pain relief with the doctor or nurse. Also, it is common to feel tired or weak for a while. The length of time it takes to recover from an operation varies for each person.

After segmental cystectomy, patients may not be able to hold as much urine in their bladder as they used to, and they may need to urinate more often. In most cases, this problem is temporary, but some patients may have long-lasting changes in how much urine they can hold.

If the surgeon removes the bladder, the patient needs a new way to store and pass urine. In one common method, the surgeon uses a piece of the person's *small intestine* to form a new tube through which urine can pass. The surgeon attaches one end of the tube to the ureters and connects the other end to a new opening in the wall of the abdomen. This opening is called a *stoma*. A flat bag fits over the stoma to collect urine, and a special adhesive holds it in place. The operation to create the stoma is called a *urostomy* or an *ostomy*. The section called "Rehabilitation" has more information about how patients learn to care for the stoma.

For some patients, the doctor is able to use a part of the small intestine to make a storage pouch (called a *continent reservoir*) inside the body. Urine collects in the pouch instead of going into a bag. The surgeon connects the pouch to the urethra or to a stoma. If the surgeon connects the pouch to a stoma, the patient uses a catheter to drain the urine.

Bladder cancer surgery may affect a person's sexual function. Because the surgeon removes the uterus and ovaries in a radical cystectomy, women are not able to get pregnant. Also, *menopause* occurs at once. Hot flashes and other symptoms of menopause caused by surgery may be more severe than those caused by natural menopause. Many women take hormone replacement therapy (HRT) to relieve these problems. If the surgeon removes part of the vagina during a radical cystectomy, sexual intercourse may be difficult.

In the past, nearly all men were *impotent* after radical cystectomy, but improvements in surgery have made it possible for some men to avoid this problem. Men who have had their prostate gland and seminal vesicles removed no longer produce *semen*, so they have *dry orgasms*. Men who wish to father children may consider *sperm banking* before surgery or *sperm retrieval* later on.

It is natural for a patient to worry about the effects of bladder cancer surgery on sexuality. Patients may want to talk with the doctor about possible side effects and how long these side effects are likely to last. Whatever the outlook, it may be helpful for patients and their partners to talk about their feelings and help one another find ways to share intimacy during and after treatment.

## Radiation Therapy

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

External radiation may permanently darken or "bronze" the skin in the treated area. Patients commonly lose hair in the treated area and their skin may become red, dry, tender, and itchy. These problems are temporary, and the doctor can suggest ways to relieve them.

Radiation therapy to the abdomen may cause nausea, vomiting, diarrhea, or urinary discomfort. The doctor can suggest medicines to ease these problems.

Radiation therapy also may cause a decrease in the number of white blood cells, cells that help protect the body against infection. If the blood counts are low, the doctor or nurse may suggest ways to avoid getting an infection. Also, the patient may not get more radiation therapy until blood counts improve. The doctor will check the patient's blood counts regularly and change the treatment schedule if it is necessary.

For both men and women, radiation treatment for bladder cancer can affect sexuality. Women may experience vaginal dryness, and men may have difficulty with erections.

Although the side effects of radiation therapy can be distressing, the doctor can usually treat or control them. It also helps to know that, in most cases, side effects are not permanent.

## Chemotherapy

The side effects of chemotherapy depend mainly on the drugs and the doses the patient receives as well as how the drugs are given. In addition, as with other types of treatment, side effects vary from patient to patient.

Anticancer drugs that are placed in the bladder cause irritation, with some discomfort or bleeding that lasts for a few days after treatment. Some drugs may cause a rash when they come into contact with the skin or genitals.

Systemic chemotherapy affects rapidly dividing cells throughout the body, including blood cells. Blood cells fight infection, help the blood to clot, and carry oxygen to all parts of the body. When anticancer drugs damage healthy blood cells, patients are more likely to get infections, may bruise or bleed easily, and may have less energy. Cells in hair roots and cells that line the digestive tract also divide rapidly. As a result, patients may lose their hair and may have other side effects such as poor appetite, nausea and vomiting, or mouth sores. Usually, these side effects go away gradually during the recovery periods between treatments or after treatment is over.

Certain drugs used in the treatment of bladder cancer also may cause kidney damage. To protect the kidneys, patients need a lot of fluid. The nurse may give the patient fluids by vein before and after treatment. Also, the patient may need to drink a lot of fluids during treatment with these drugs.

Certain anticancer drugs can also cause tingling in the fingers, ringing in the ears, or hearing loss. These problems may go away after treatment stops.

### Biological Therapy

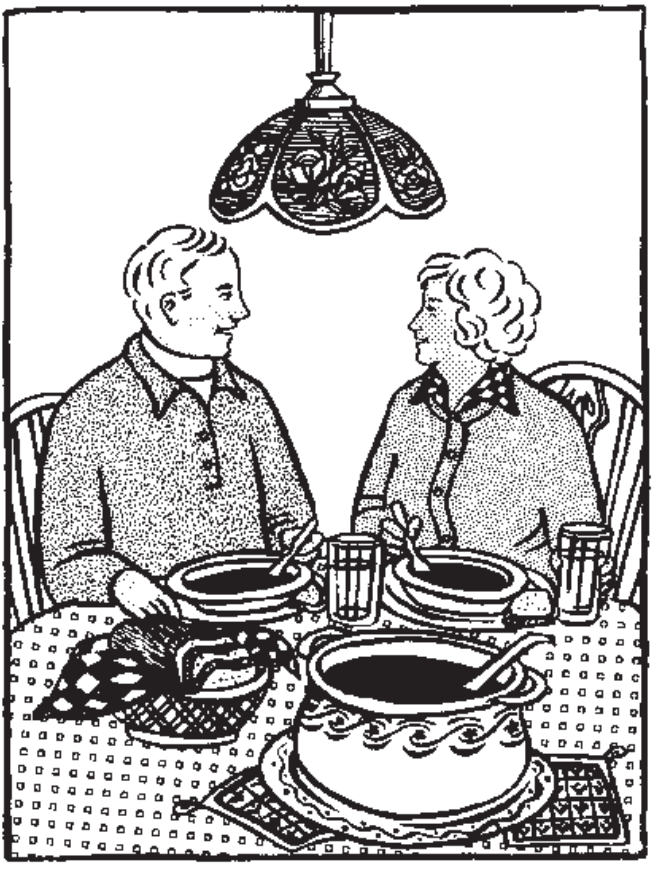
BCG therapy can irritate the bladder. Patients may feel an urgent need to urinate, and may need to urinate frequently. Patients also may have pain, especially when urinating. They may feel tired. Some patients may have blood in their urine, nausea, or a low-grade fever or chills.

## Nutrition

Patients need to eat well during cancer therapy. They need enough calories to maintain a good weight and protein to keep up strength. Good nutrition often helps people with cancer feel better and have more energy.

But eating well can be difficult. Patients may not feel like eating if they are uncomfortable or tired. Also, the side effects of treatment, such as poor appetite, nausea, or vomiting, can be a problem. Foods may taste different.

The doctor, dietitian, or other health care provider can suggest ways to maintain a healthy diet. Patients and their families may want to read the National Cancer Institute booklet *Eating Hints for Cancer Patients*, which contains many useful ideas and recipes. The "National Cancer Institute Booklets" section tells how to get this publication.



## Rehabilitation

Rehabilitation is an important part of cancer care. The health care team makes every effort to help the patient return to normal activities as soon as possible.

Patients who have a stoma need to learn to care for it. *Enterostomal therapists* or nurses can help. These health care specialists often visit patients before surgery to discuss what to expect. They teach patients how to care for themselves and their stomas after surgery. They

talk with patients about lifestyle issues, including emotional, physical, and sexual concerns. Often they can provide information about resources and support groups.

## Followup Care

Followup care after treatment for bladder cancer is important. Bladder cancer can return in the bladder or elsewhere in the body. Therefore, people who have had bladder cancer may wish to discuss the chance of recurrence with the doctor.

If the bladder was not removed, the doctor will perform cystoscopy and remove any new superficial tumors that are found. Patients also may have urine tests to check for signs of cancer. Followup care may also include blood tests, x-rays, or other tests.

People should not hesitate to discuss followup care with the doctor. Regular followup ensures that the doctor will notice changes so that any problems can be treated as soon as possible. Between checkups, people who have had bladder cancer should report any health problems as soon as they appear.

## Support for People with Bladder Cancer

Living with a serious disease such as cancer is not easy. Some people find they need help coping with the emotional and practical aspects of their disease. Support groups can help. In these groups, patients or their family members get together to share what they have learned about coping with the disease and the effects of treatment. Patients may want to talk with a member of their health care team about finding a support group.

People living with cancer may worry about caring for their families, holding on to their jobs, or keeping up with daily activities. Concerns about treatments and managing side effects, hospital stays, and medical bills are also common. Doctors, nurses, and other members of the health care team will answer questions about treatment, working, or other activities. Meeting with a social worker, counselor, or member of the clergy can be helpful to those who want to talk about their feelings or discuss their concerns. Often, a social worker can suggest resources for help with rehabilitation, emotional support, financial aid, transportation, or home care.

Materials on coping are available from the Cancer Information Service (1–800–4–CANCER) and through other sources listed in the "National Cancer Institute Information Resources" section. The Cancer Information Service can also provide information to help patients and their families locate programs and services.

## The Promise of Cancer Research

Doctors all over the country are conducting many types of clinical trials. These are research studies in which people take part voluntarily. Doctors are studying ways to treat bladder cancer and prevent it from coming back. Research already has led to advances in these areas, and researchers continue to search for more effective approaches.

Patients who join clinical trials have the first chance to benefit from new treatments that have shown promise in earlier research. They also make an important contribution to medical science by helping doctors learn more about the disease. Although clinical

trials may pose some risks, researchers take many steps to protect their patients.

Patients who are interested in joining a clinical study should talk with their doctor. They may want to read *Taking Part in Clinical Trials: What Cancer Patients Need To Know*. This NCI booklet describes how treatment studies are carried out and explains their possible benefits and risks. NCI's cancerTrials™ Web site at **http://cancertrials.nci.nih.gov** provides general information about clinical trials. It also offers detailed information about specific ongoing studies of bladder cancer by linking to PDQ®, NCI's cancer information database. The Cancer Information Service at 1–800–4–CANCER can answer questions and provide information from the PDQ database.

Doctors are studying surgery, radiation therapy, chemotherapy, biological therapy, and combinations of these types of treatment. Another approach under study is *photodynamic therapy*, which uses drugs that start to work when exposed to light. After the cancer cells absorb the drug, the doctor shines a special light inside the bladder through a cystoscope. The drug becomes active and kills the cancer cells.

Doctors also are studying whether large doses of vitamins or certain drugs may prevent bladder cancer from coming back after treatment.

## Dictionary

***Abdomen*** (AB-do-men): The part of the body that contains the pancreas, stomach, intestines, liver, gallbladder, and other organs.

***Anesthesia*** (an-es-THEE-zha): Loss of feeling or awareness. Local anesthetics cause loss of feeling in a part of the body. General anesthetics put the person to sleep.

***Arsenic***: A poisonous chemical used to kill weeds and pests. Also used in cancer therapy.

***Bacteria***: A large group of single-cell microorganisms. Some cause infections and disease in animals and humans. The singular of bacteria is bacterium.

***BCG solution***: A form of biological therapy for superficial bladder cancer. A catheter is used to place the BCG solution into the bladder. The solution contains live, weakened bacteria (bacille Calmette-Guerin) that activate the immune system. The BCG solution used for bladder cancer is not the same thing as BCG vaccine, a vaccine for tuberculosis.

***Benign*** (beh-NINE): Not cancerous; does not invade nearby tissue or spread to other parts of the body.

***Biological therapy*** (by-o-LAHJ-i-kul): Treatment to stimulate or restore the ability of the immune system to fight infection and disease. 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*** (BY-ahp-see): 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 tumor or lesion 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.

***Bone scan***: A technique to create images of bones on a computer screen or on film. A small amount of radioactive material is injected into a blood vessel and travels through the bloodstream; it collects in the bones and is detected by a scanner.

***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.

***Carcinogen*** (kar-SIN-o-jin): Any substance that causes cancer.

***Carcinoma in situ*** (kar-sin-O-ma in SYE-too): Cancer that involves only the cells in which it began and that has not spread to neighboring tissues.

***Catheter*** (KATH-i-ter): A flexible tube used to deliver fluids into or withdraw fluids from the body.

***Chemotherapy*** (kee-mo-THER-a-pee): Treatment with anticancer drugs.

***Chlorine***: A chemical used to disinfect water and as a bleach.

***Clinical trial***: A research study that tests how well new medical treatments or other interventions work in people. Each study is designed to test new methods of screening, prevention, diagnosis, or treatment of a disease.

***Continent reservoir*** (KAHN-tih-nent RES-er-vwar): A pouch formed from a piece of small intestine to hold urine after the bladder has been removed.

***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.

***Cyclophosphamide***: An anticancer drug that belongs to the family of drugs called alkylating agents.

***Cystectomy*** (sis-TEK-toe-mee): Surgery to remove all or part of the bladder.

***Cystoscope*** (SIS-toe-skope): A thin, lighted instrument used to look inside the bladder and remove tissue samples or small tumors.

***Cystoscopy*** (sist-OSS-ko-pee): Examination of the bladder and urethra using a thin, lighted instrument (called a cystoscope) inserted into the urethra. Tissue samples can be removed and examined under a microscope to determine whether disease is present.

***Dry orgasm***: Sexual climax without the release of semen from the penis.

***Enterostomal therapist*** (en-ter-o-STO-mul): A health professional trained in the care of persons with urostomies and other stomas.

***External radiation*** (ray-dee-AY-shun): Radiation therapy that uses a machine to aim high-energy rays at the cancer. Also called external-beam radiation.

***Fallopian tubes*** (fa-LO-pee-in): Part of the female reproductive tract. The long slender tubes through which eggs pass from the ovaries to the uterus.

***Fulguration*** (ful-gyoor-AY-shun): Destroying tissue using an electric current.

***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.

***Grade***: The grade of a tumor depends on how abnormal the cancer cells look under a microscope and how quickly the tumor is likely to grow and spread. Grading systems are different for each type of cancer.

***Imaging***: Tests that produce pictures of areas inside the body.

***Immune system*** (im-YOON): The complex group of organs and cells that defends the body against infection or disease.

***Impotent*** (IM-po-tent): Unable to have an erection adequate for sexual intercourse.

***Incision*** (in-SIH-zhun): A cut made in the body during surgery.

***In situ cancer***: Early cancer that has not spread to neighboring tissue.

***Internal radiation*** (ray-dee-AY-shun): A procedure in which radioactive material sealed in needles, seeds, wires, or catheters is placed directly into or near the tumor. Also called brachytherapy, implant radiation, or interstitial radiation therapy.

***Intravenous*** (in-tra-VEE-nus): IV. Into a vein.

***Intravenous pyelogram*** (in-tra-VEE-nus PYE-el-o-gram): IVP. 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.

***Intravesical*** (in-tra-VES-ih-kal): Within the bladder.

***Invasive cancer***: Cancer that has spread beyond the layer of tissue in which it developed and is growing into surrounding, healthy tissues. Also called infiltrating cancer.

***Kidneys*** (KID-neez): 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 tumor and the area close to it.

***Lymph node***: A rounded mass of lymphatic tissue that is surrounded by a capsule of connective tissue. Also known as a lymph gland. Lymph nodes are spread out along lymphatic vessels and contain many lymphocytes, which filter the lymphatic fluid (lymph).

***Lymphatic system*** (lim-FAT-ik): 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 network of thin tubes that carry lymph and white blood cells. These tubes branch, like blood vessels, into all the tissues of the body.

***Magnetic resonance imaging*** (mag-NET-ik REZ-o-nans IM-a-jing): MRI. A procedure in which a magnet linked to a computer is used to create detailed pictures of areas inside the body.

***Malignant*** (ma-LIG-nant): Cancerous; a growth with a tendency to invade and destroy nearby tissue and spread to other parts of the body.

***Medical oncologist*** (on-KOL-o-jist): A doctor who specializes in diagnosing and treating cancer using chemotherapy, hormonal therapy, and biological therapy. A medical oncologist often serves as the main caretaker of someone who has cancer and coordinates treatment provided by other specialists.

***Menopause*** (MEN-o-pawz): The time of life when a woman's menstrual periods stop permanently. Also called "change of life."

***Metastasis*** (meh-TAS-ta-sis): The spread of cancer from one part of the body to another. Tumors formed from cells that have spread are called "secondary tumors" and contain cells that are like those in the original (primary) tumor. The plural is metastases.

***Metastasize*** (meh-TAS-ta-size): To spread from one part of the body to another. When cancer cells metastasize and form secondary tumors, the cells in the metastatic tumor are like those in the original (primary) tumor.

***MRI***: Magnetic resonance imaging (mag-NET-ik REZ-o-nans IM-a-jing). A procedure in which a magnet linked to a computer is used to create detailed pictures of areas inside the body.

***Ostomy*** (AHS-toe-mee): An operation to create an opening (a stoma) from an area inside the body to the outside. Colostomy and urostomy are types of ostomies.

***Ovaries*** (O-va-reez): The pair of female reproductive glands in which the ova, or eggs, are formed. The ovaries are located in the pelvis, one on each side of the uterus.

***Parasite***: An animal or a plant that lives on or in an organism of another species and gets at least some of its nutrition from that other organism.

***Pathologist*** (pa-THOL-o-jist): A doctor who identifies diseases by studying cells and tissues under a microscope.

***Pelvis***: The lower part of the abdomen, located between the hip bones.

***Photodynamic therapy*** (foe-toe-dye-NAM-ik): Treatment with drugs that become active when exposed to light. These drugs kill cancer cells.

***Primary tumor***: The original tumor.

***Prostate*** (PROS-tate): A gland in the male reproductive system just below the bladder. It surrounds part of the urethra, the canal that empties the bladder, and produces a fluid that forms part of semen.

***Quality of life***: The overall enjoyment of life. Many clinical trials measure aspects of an individual's sense of well-being and ability to perform various tasks to assess the effects of cancer and its treatment on the quality of life.

***Radiation oncologist*** (ray-dee-AY-shun on-KOL-o-jist): A doctor who specializes in using radiation to treat cancer.

***Radiation therapy*** (ray-dee-AY-shun): The use of high-energy radiation from x-rays, gamma rays, neutrons, and other sources to kill cancer cells and shrink tumors. Radiation may come from a machine outside the body (external-beam radiation therapy), or it may come from radioactive material placed in the body in the area near cancer cells (internal radiation therapy, implant radiation, or brachytherapy). Systemic radiation therapy uses a radioactive substance, such as a radiolabeled monoclonal antibody, that circulates throughout the body. Also called radiotherapy.

***Radical cystectomy*** (RAD-ih-kal sis-TEK-toe-mee): Surgery to remove the bladder as well as nearby tissues and organs.

***Radioactive*** (RAY-dee-o-AK-tiv): Giving off radiation.

***Rectal***: By or having to do with the rectum. The rectum is the last 8 to 10 inches of the large intestine and ends at the anus.

***Recur***: To occur again. Recurrence is the return of cancer, at the same site as the original (primary) tumor or in another location, after the tumor had disappeared.

***Risk factor***: A habit, trait, condition, or genetic alteration that increases a person's chance of developing a disease.

***Segmental cystectomy*** (sis-TEK-to-mee): The removal of the cancer as well as some of the bladder tissue around the tumor. Sometimes called partial cystectomy.

***Semen***: The fluid that is released through the penis during orgasm. Semen is made up of sperm from the testicles and fluid from the prostate and other sex glands.

***Seminal vesicles*** (SEM-in-al VES-ih-kulz): Glands that help produce semen.

***Side effects***: Problems that occur when treatment affects healthy cells. Common side effects of cancer treatment are fatigue, nausea, vomiting, decreased blood cell counts, hair loss, and mouth sores.

***Small intestine***: The part of the digestive tract that is located between the stomach and the large intestine.

***Sonogram*** (SON-o-gram): A computer picture of areas inside the body created by bouncing sound waves off organs and other tissues. Also called ultrasonogram or ultrasound.

***Sperm banking***: Freezing sperm for use in the future. This procedure can allow men to father children after loss of fertility.

***Sperm retrieval***: The doctor removes sperm from a man's reproductive tract (testis or epididymis) using a fine needle or another instrument.

***Squamous cell carcinoma*** (SKWAY-mus. . .kar-sin-O-ma): Cancer that begins in squamous cells, which are thin, flat cells resembling fish scales. Squamous cells are found in the tissue that forms the surface of

the skin, the lining of the hollow organs of the body, and the passages of the respiratory and digestive tracts. Also called epidermoid carcinoma.

***Squamous cells*** (SKWAY-mus): Flat cells that look like fish scales under a microscope. These cells cover internal and external surfaces of the body.

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

***Staging***: Performing exams and tests to learn the extent of the cancer within the body, especially whether the disease has spread from the original site to other parts of the body.

***Stoma***: A surgically created opening from an area inside the body to the outside.

***Superficial***: Affecting cells on the surface. Not invasive.

***Surgeon***: A doctor who removes or repairs a part of the body by operating on the patient.

***Surgery***: A procedure to remove or repair a part of the body or to find out whether disease is present.

***Symptom***: An indication that a person has a condition or disease. Some examples of symptoms are headache, fever, fatigue, nausea, vomiting, and pain.

***Systemic therapy*** (sis-TEM-ik): Treatment that uses substances that travel through the bloodstream, reaching and affecting cells all over the body.

***Tissue*** (TISH-oo): A group or layer of cells that are alike in type and 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.

***Transitional cells***: Cells that vary in shape depending on whether the tissue is being stretched. The cells may be stretched without breaking apart. They line hollow organs such as the bladder.

***Transurethral resection*** (TRANZ-yu-REE-thral ree-SEK-shun): Surgery performed with a special instrument inserted through the urethra. Also called TUR.

***Tumor*** (TOO-mer): An abnormal mass of tissue that results from excessive cell division. Tumors perform no useful body function. They may be benign (not cancerous) or malignant (cancerous).

***Ureter*** (yoo-REE-ter): The tube that carries urine from the kidney to the bladder.

***Urethra*** (yoo-REE-thra): The tube through which urine leaves the body. It empties urine from the bladder.

***Urine*** (YOO-rin): Fluid containing water and waste products. Urine is made by the kidneys, stored in the bladder, and leaves the body through the urethra.

***Urologic oncologist*** (yoor-uh-LAHJ-ik on-KOL-o-jist): A doctor who specializes in treating cancers of the urinary system.

***Urologist*** (yoo-RAHL-o-jist): A doctor who specializes in diseases of the urinary organs in females and the urinary and sex organs in males.

***Urostomy*** (yoo-RAHS-toe-mee): An operation to create an opening from inside the body to the outside, making a new way to pass urine.

***Uterus*** (YOO-ter-us): The small, hollow, pear-shaped organ in a woman's pelvis. This is the organ in which a fetus develops. Also called the womb.

***Vagina*** (vah-JYE-na): The muscular canal extending from the uterus to the exterior of the body. Also called the birth canal.

***Vaginal***: Of or having to do with the vagina, the birth canal.

***Vas deferens***: A coiled tube that carries the sperm out of the testes.

***X-ray***: High-energy radiation used in low doses to diagnose diseases and in high doses to treat cancer.

## National Cancer Institute Information Resources

You may want more information for yourself, your family, and your doctor. The following National Cancer Institute (NCI) services are available to help you.

### Telephone

***Cancer Information Service (CIS)***

Provides accurate, up-to-date information on cancer to patients and their families, health professionals, and the general public. Information specialists translate the latest scientific information into understandable language and respond in English, Spanish, or on TTY equipment.

Toll-free: 1–800–4–CANCER (1–800–422–6237)

TTY: 1–800–332–8615

### Internet

These Web sites may be useful:

**http://cancer.gov**

NCI's primary Web site; contains information about the Institute and its programs.

**http://cancertrials.nci.nih.gov**

cancerTrials™; NCI's comprehensive clinical trials information center for patients, health professionals, and the public. Includes information on understanding trials, deciding whether to participate in trials, finding specific trials, plus research news and other resources.

**http://cancernet.nci.nih.gov**

CancerNet™; contains material for health professionals, patients, and the public, including information from PDQ® about cancer treatment, screening, prevention, supportive care, genetics, and clinical trials; CANCERLIT®, a bibliographic database; and a dictionary of medical terms related to cancer and its treatment.

## E-mail

***CancerMail***

Includes NCI information about cancer treatment, screening, prevention, genetics, and supportive care. To obtain a contents list, send an e-mail to **cancermail@cips.nci.nih.gov** with the word "help" in the body of the message.

## Fax

***CancerFax®***

Includes NCI information about cancer treatment, screening, prevention, and supportive care. To obtain a contents list, dial 1–800–624–2511 or 301–402–5874 from your touch-tone phone or fax machine handset and follow the recorded instructions.

## National Cancer Institute Booklets

These National Cancer Institute (NCI) booklets are available from the Cancer Information Service by calling 1–800–4–CANCER. They are also available on the NCI Web site, which is located on the Internet at **http://cancer.gov/publications**.

### Booklets About Cancer Treatment

- *Chemotherapy and You: A Guide to Self-Help During Treatment*
- *Help Yourself During Chemotherapy: 4 Steps for Patients*
- *Radiation Therapy and You: A Guide to Self-Help During Treatment*
- *Eating Hints for Cancer Patients*
- *Understanding Cancer Pain*
- *Pain Control: A Guide for People with Cancer and Their Families*
- *Get Relief From Cancer Pain*
- *Taking Part in Clinical Trials: What Cancer Patients Need To Know*
- *El dolor relacionado con el cáncer (Understanding Cancer Pain)*
- *La quimioterapia y usted: Una guía de auto ayuda durante el tratamiento del cáncer (Chemotherapy and You: A Guide to Self-Help During Treatment)*
- *El tratamiento de radioterapia: Guía para el paciente durante el tratamiento (Radiation Therapy and You: A Guide to Self-Help During Treatment)*
- *¿En qué consisten los estudios clínicos? Un folleto para los pacientes de cáncer (What Are Clinical Trials All About? A Guide for Cancer Patients)*

## Booklets About Living With Cancer

- *Taking Time: Support for People With Cancer and the People Who Care About Them*
- *Facing Forward: A Guide for Cancer Survivors*
- *When Cancer Recurs: Meeting the Challenge*
- *Advanced Cancer: Living Each Day*

This booklet was written and published by the National Cancer Institute (NCI), 31 Center Drive, MSC 2580, Bethesda, MD 20892–2580. The NCI, the largest component of the National Institutes of Health, coordinates a national research program on cancer causes and prevention, detection and diagnosis, and treatment. In addition, NCI's mission includes dissemination of information about cancer to patients, the public, and health professionals.

The National Cancer Act, passed by Congress in 1971, made research a National priority. Since that time, the NCI, the lead Federal agency for cancer research, has collaborated with top researchers and facilities across the country to conduct innovative research leading to progress in cancer prevention, detection, diagnosis, and treatment. These efforts have resulted in a decrease in the overall cancer death rate, and have helped improve and extend the lives of millions of Americans.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