



# GUIDE TO PROSTATE CANCER



Comprehensive, oncologist-approved cancer information from the American Society of Clinical Oncology (ASCO)

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The best cancer care starts with the best cancer information. Well-informed patients are their own best advocates and invaluable partners for physicians. ASCO's patient education materials are available both in print and online to provide trusted, authoritative information for people living with cancer and those who care for and about them.

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## OVERVIEW

Cancer begins when normal cells in the prostate change and grow uncontrollably, forming a mass called a tumor. A tumor can be benign (noncancerous) or malignant (cancerous, meaning it can spread to other parts of the body).

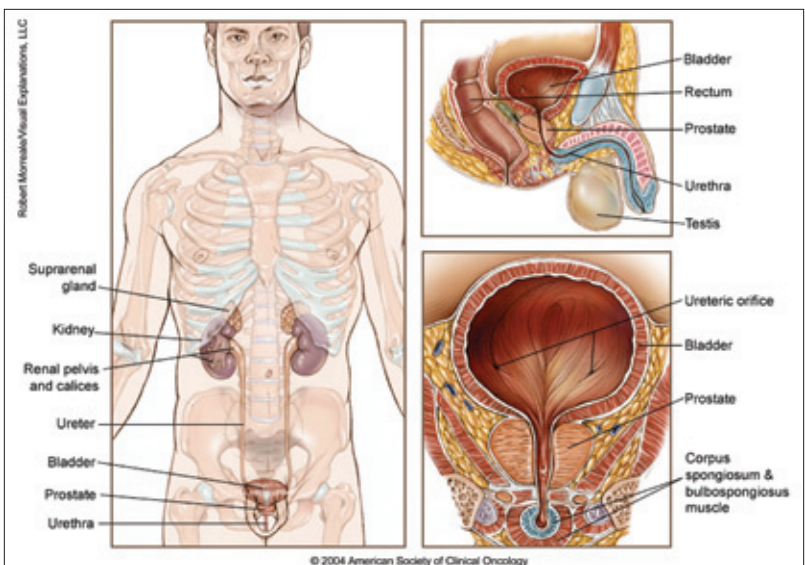
### About the prostate gland

The prostate is a walnut-sized gland located behind the base of a man's penis, in front of the rectum, and below the bladder. It surrounds the urethra, the tube-like channel that carries urine and semen through the penis. The prostate's main function is to make seminal fluid, the liquid in semen that protects, supports, and helps transport sperm.

### Types of prostate cancer

Prostate cancer is a cancerous tumor that begins in the prostate gland. Some prostate cancers grow very slowly and may not cause symptoms or problems for years. Many times, when a man develops prostate cancer much later in life, it is unlikely to cause symptoms or shorten the man's life, and aggressive treatment may not be needed. Prostate cancer is somewhat unusual, compared with other types of cancer, because many tumors do not spread from the prostate. And often, even metastatic prostate cancer can be successfully treated, allowing men with prostate cancer to live with good health for some years. However, if cancer does metastasize (spread) to other parts of the body, it can cause pain, fatigue, and other symptoms.

More than 95% of prostate cancers are adenocarcinomas, cancers that develop in glandular tissue. A rare type of prostate cancer known as neuroendocrine cancer or small cell anaplastic cancer tends to spread earlier but usually does not make



Anatomical and staging illustrations for many types of cancer are available at [www.cancer.net](http://www.cancer.net).

prostate-specific antigen (PSA), a tumor marker discussed in the Risk Factors and Prevention section. Read more about neuroendocrine tumors at [www.cancer.net/neuroendocrine](http://www.cancer.net/neuroendocrine).

## STATISTICS

Prostate cancer is the most common cancer and the second leading cause of cancer death in men. Although the number of deaths from prostate cancer is declining among all men, the death rate remains more than twice as high in black men than in white men.

More than 90% of all prostate cancers are found when the disease is located only in the prostate and nearby organs. Nearly all men who develop prostate cancer are expected to live at least five years after diagnosis. The 10-year and 15-year survival rates (the percentage of people who survive at least 10 or 15 years after the cancer is detected, excluding those who die from other diseases) are 95% and 82%, respectively. These survival rates are a combination of early-stage and later-stage prostate cancers; a man's individual survival depends on the type of prostate cancer and the stage of the disease.

Cancer survival statistics should be interpreted with caution. These estimates are based on data from thousands of men with this type of cancer in the United States each year, but the actual risk for a particular individual may differ. It is not possible to tell a man how long he will live with prostate cancer. Because survival statistics are often measured in multi-year intervals, they may not represent advances made in the treatment or diagnosis of this cancer. Learn more about understanding statistics at [www.cancer.net/firststeps](http://www.cancer.net/firststeps).

Statistics adapted from the American Cancer Society.

Find out more about basic cancer terms used in this section at [www.cancer.net/dictionaryresources](http://www.cancer.net/dictionaryresources).

## RISK FACTORS AND PREVENTION

A risk factor is anything that increases a person's chance of developing cancer. Although risk factors can influence the development of cancer, most do not directly cause cancer. Some people with several risk factors never develop cancer, while others with no known risk factors do. However, knowing your risk factors and talking about them with your doctor may help you make more informed lifestyle and health care choices.

Because the exact cause of prostate cancer is still unknown, it is also unknown how to prevent prostate cancer. The following factors can raise a man's risk of developing prostate cancer:

**Age.** The risk of prostate cancer increases with age, especially after age 50. About 60% of prostate cancers are diagnosed in men who are 65 or older.



**Race/ethnicity.** African American men have a higher risk of prostate cancer than white men. They are more likely to develop prostate cancer at an earlier age and to have aggressive tumors that grow quickly. The exact reasons for these differences are not known and probably involve both biologic and socioeconomic factors. Some scientists believe that a high-fat diet, which can be common in many parts of the African American community, plays a role in the development of prostate cancer (see the Diet heading below for more detail). It may also be due to genetic factors within the African American community, but the specific genes are not known. Prostate cancer occurs most often in North America and northern Europe and is less common in Asia, Africa, and Latin America. However, it appears that prostate cancer is increasing among Asian people living in urbanized environments, such as Hong Kong, Singapore, and North American and European cities, particularly among those who have a more western lifestyle.

**Family history.** A man who has a father or brother with prostate cancer has a higher risk of developing the disease than a man who does not. Researchers have discovered specific genes that may possibly be associated with prostate cancer, although these have not yet been shown to cause prostate cancer or to be specific to this disease. Learn more about the genetics of prostate cancer at [www.cancer.net/genetics](http://www.cancer.net/genetics).

**Diet.** No study has proven that diet and nutrition can directly cause or prevent the development of prostate cancer, but many studies indicate there may be a link. There is not enough information yet to make clear recommendations about the role diet plays in prostate cancer, and dietary changes may need to be made many years earlier in a man's life to reduce the risk of developing prostate cancer. The following dietary information may be helpful:

- A diet high in fat, especially animal fat, may increase prostate cancer risk. In fact, many doctors believe that a low-fat diet may help to reduce the risk of prostate cancer.
- A diet high in vegetables, fruits, and legumes (beans and peas) may decrease risk of prostate cancer. It is unclear which nutrients are directly responsible. Lycopene, found in tomatoes and other vegetables, may slow or prevent cancer growth. In any case, such a diet does not cause harm and can lower a person's blood pressure and risk of heart disease.
- Selenium, an element that people get in very small amounts from food and water, and vitamin E have been tested to

find out if either or both of these nutrients can lower the risk of prostate cancer. However, in a clinical trial (a research study involving people) of more than 35,000 men called the Selenium and Vitamin E Cancer Prevention Trial (SELECT), researchers found that selenium and vitamin E supplements (pills), taken alone or together for an average of five years, did not prevent prostate cancer and may even cause harm in some men. Because of this risk, the National Cancer Institute has stopped the SELECT study. Men should talk with their doctor before taking selenium and vitamin E supplements to prevent prostate cancer.

It's important to remember that specific changes to your diet may not stop or slow the development of prostate cancer, and it's possible such changes would need to begin early in life to have an effect.

**Hormones and chemoprevention.** High levels of testosterone (a male sex hormone) may speed up or cause the development of prostate cancer. For instance, it is very uncommon for a man whose body no longer makes testosterone to develop prostate cancer. And, stopping the body's production of testosterone, called androgen deprivation therapy, often shrinks advanced prostate cancer.

A class of drugs called 5-alpha-reductase inhibitors (5-ARIs) that includes finasteride (Proscar) and dutasteride (Avodart) may lower a man's risk of prostate cancer. In clinical trials, both drugs lowered the risk of prostate cancer. At first one of these trials suggested that a few men who took finasteride had a higher risk of developing a more aggressive type of prostate cancer than the men who did not receive finasteride. However, looking more closely at these drugs has shown that finasteride causes the prostate gland to shrink, which may have allowed the doctors to find these more aggressive cancers. But, the data are still being reviewed, and the subject is controversial. Learn about recommendations from ASCO and the American Urological Association on finasteride for prostate cancer prevention at [www.cancer.net/whattoknow](http://www.cancer.net/whattoknow).

### **Prostate cancer screening**

Screening for prostate cancer is done to find evidence of cancer in otherwise healthy men. Two tests are commonly used to screen for prostate cancer: the prostate-specific antigen (PSA) blood test and digital rectal examination (DRE, a test in which the doctor inserts a gloved, lubricated finger into a man's rectum and feels the surface of the prostate for any irregularities). PSA is found in higher-than-normal levels in men with various prostate conditions, including benign prostatic hyperplasia (BPH, an enlarged prostate), inflammation or infection of the prostate, and prostate cancer.

There is controversy about using the PSA test to screen large numbers of men with no symptoms for prostate cancer. On one



hand, the PSA test is useful for detecting early prostate cancer, which helps men get the treatment they need before the cancer spreads. On the other hand, PSA screening has not yet been proven to lower death rates from prostate cancer in the general community. And, this test finds conditions that are not cancer, as well as misses some prostate cancers.

Unlike other types of cancer, prostate cancer grows slowly in many men—so slowly that in some men it would not threaten their life, even if not treated. Because of this, screening for prostate cancer may mean that some men have surgery and other treatments that may not ever be needed. For this reason, many men and their doctors may consider active surveillance (see the Treatment section) of the cancer rather than immediate treatment.

Because prostate cancer treatments have significant side effects, such as impotence (inability to get an erection) and incontinence (inability to control urine flow), treating it unnecessarily may seriously affect a man's quality of life. However, it is not easy to predict which tumors will grow and spread quickly and which will grow slowly. This has led some doctors to believe that it is wise to use relatively safe screening tests, such as the PSA test, to detect aggressive cancers early, even if it means that some patients will receive unnecessary treatment.

Three clinical trials have reported results on prostate cancer screening:

- In the Prostate, Lung, Colorectal, and Ovarian (PLCO) Cancer Screening Trial, researchers found more cancers with screening, but they also found no difference in deaths from prostate cancer in men who were screened with PSA and DRE tests compared with men who were not screened for up to 11 years after the screening began.
- In the European Randomized Study of Screening for Prostate Cancer (ERSPC) trial, researchers saw a small reduction in prostate cancer deaths of men who were screened for prostate cancer (7 deaths per 10,000 men screened), but the overall survival was the same in the two groups.
- Another clinical trial called the Göteborg Trial found prostate cancer screening reduced deaths from prostate cancer by almost half. However, the study did not look at whether the screening improved the survival of the men diagnosed with prostate cancer. Results also showed that many men needed to be screened and diagnosed in order to prevent one death from prostate cancer.

Every man should discuss his situation and risk of prostate cancer and work with his doctor to make a decision. For example, men older than 75 may not need screening.

No study definitely proves that screening is more beneficial for men at higher risk of prostate cancer, or for African American men versus white men. Many experts feel that it is generally



safer to use screening for these men in the hope of finding aggressive types of prostate cancer earlier when it may be easier to treat. However, this has not been proven in clinical trials. Read about talking with your doctor about PSA screening at [www.cancer.net/features](http://www.cancer.net/features).

## **SYMPTOMS AND SIGNS**

Often, prostate cancer is found through a PSA test or DRE (see Risk Factors and Prevention) in men who have not had any symptoms or signs. When prostate cancer does cause symptoms or signs, they may include the following:

- Frequent urination
- Weak or interrupted urine flow
- Blood in the urine
- The urge to urinate frequently at night
- Blood in the seminal fluid
- Pain or burning during urination (much less common)

None of these symptoms is specific to prostate cancer. Men who have a noncancerous condition called BPH or an enlarged prostate also have these symptoms. Urinary symptoms also can be caused by an infection or other conditions. In addition, sometimes men with prostate cancer do not have any of these symptoms.

If cancer has spread outside of the prostate gland, a man may experience:

- Pain in the back, hips, thighs, shoulders, or other bones
- Unexplained weight loss
- Fatigue

If you are concerned about a symptom or sign on this list, please talk with your doctor. Your doctor will ask you questions about the symptoms you are experiencing to help find out the cause of the problem, called a diagnosis. This may include how long you've been experiencing the symptom(s) and how often.

If cancer is diagnosed, relieving symptoms and side effects remains an important part of cancer care and treatment. This may also be called symptom management, palliative care, or supportive care. Be sure to talk with your health care team about symptoms you experience, including any new symptoms or a change in symptoms.

## **DIAGNOSIS**

Doctors use many tests to diagnose cancer and find out if it has metastasized. Some tests may also determine which treatments may be the most effective. For most types of cancer, a biopsy is the only way to make a definitive diagnosis of cancer. If a biopsy is not possible, the doctor may suggest other tests that will help

make a diagnosis, but this situation is rare for prostate cancer. For example, a biopsy may not be done when a patient has another medical problem that makes it difficult to do a biopsy, or when a person has a very high PSA level and a bone scan that indicates cancer. Imaging tests may be used to find out whether the cancer has spread. Your doctor may consider these factors when choosing a diagnostic test:

- Age and medical condition
- Type of cancer suspected
- Severity of symptoms
- Previous test results

In addition to a physical examination, the following tests may be used to diagnose prostate cancer:

**PSA test.** As described in Risk Factors and Prevention, PSA is a type of protein released by prostate tissue that is found in higher levels in a man's blood when there is abnormal activity in the prostate, including prostate cancer, BPH, or inflammation of the prostate. Doctors can look at features of the PSA value—such as absolute level, change over time, and level in relation to prostate size—to decide if a biopsy is needed. In addition, a version of the PSA test allows the doctor to measure a specific component, called the “free” PSA, which can sometimes help find out if a tumor is noncancerous or cancerous.

**DRE.** This test is used to find abnormal parts of the prostate by feeling the area using a finger (see Risk Factors and Prevention). It is not very precise; therefore, most men with early prostate cancer have normal DRE test results.

If the PSA or DRE test results are abnormal, the following tests can confirm a diagnosis of cancer:

**Transrectal ultrasound (TRUS).** A doctor inserts a probe into the rectum that takes a picture of the prostate using sound waves that bounce off the prostate.

**Biopsy.** A biopsy is the removal of a small amount of tissue for examination under a microscope. Other tests can suggest that cancer is present, but only a biopsy can make a definite diagnosis. To get a tissue sample, a surgeon most often uses TRUS and a biopsy tool to take very small slivers of prostate tissue. The sample removed with the biopsy is analyzed by a pathologist (a doctor who specializes in interpreting laboratory tests and evaluating cells, tissues, and organs to diagnose disease). A patient usually can have this procedure at the hospital or doctor's office without needing to stay overnight. The patient is given local anesthesia beforehand to numb the area.

To find out if cancer has spread outside of the prostate, doctors may perform the following imaging tests:

**Bone scan.** A bone scan uses a radioactive tracer to look at the inside of the bones. The tracer is injected into a patient's vein. It collects in areas of the bone and is detected by a special camera. Healthy bone appears gray to the camera, and areas of injury, such as those caused by cancer, appear dark.

**Computed tomography (CT or CAT) scan.** A CT scan creates a three-dimensional picture of the inside of the body with an x-ray machine. A computer then combines these images into a detailed, cross-sectional view that shows any abnormalities or tumors. Sometimes, a contrast medium (a special dye) is injected into a patient's vein to provide better detail.

**Magnetic resonance imaging (MRI).** An MRI uses magnetic fields, not x-rays, to produce detailed images of the body. A contrast medium may be injected into a patient's vein to create a clearer picture.

After these diagnostic tests are done, your doctor will review all of the results with you. If the diagnosis is cancer, these results also help the doctor describe the cancer; this is called staging.

Learn more about the first steps to take after a diagnosis of cancer at [www.cancer.net/firststeps](http://www.cancer.net/firststeps) and what to expect when having common tests, procedures, and scans at [www.cancer.net/tests](http://www.cancer.net/tests).

## STAGING

Staging is a way of describing a cancer, such as where it is located, if or where it has spread, and whether it is affecting the functions of other organs in the body. Doctors use diagnostic tests to determine the cancer's stage, so staging may not be complete until all of the tests are finished. Staging for prostate cancer also involves looking at test results to find out if the cancer has spread from the prostate to other parts of the body. Knowing the stage helps the doctor to decide what kind of treatment is best and can help predict a patient's prognosis (chance of recovery). There are different stage descriptions for different types of cancer.



There are two types of staging for prostate cancer:

- The clinical stage is based on the results of tests done before surgery, such as a biopsy, x-rays, CT scans, and bone scans. X-rays, bone scans, and CT scans may not always be needed. They are recommended based on the level of serum PSA, the grade and volume (size) of the cancer, and the clinical stage of the cancer.
- The pathologic stage is based on information found during surgery, plus the laboratory results (pathology) of the prostate

tissue removed during surgery (which often includes the removal of the entire prostate and some lymph nodes).

One tool that doctors use to describe the stage is the TNM system, developed by the American Joint Committee on Cancer (AJCC) and the Union International Contre le Cancer (UICC). This system is most commonly used in the United States and judges three factors: the tumor itself, the lymph nodes around the tumor, and whether the tumor has spread to other parts of the body. The results are combined to determine the stage of cancer for each person. There are four stages: stages I through IV (one through four). The stage provides a common way of describing the cancer, so doctors can work together to plan the best treatments.

TNM is an abbreviation for tumor (T), node (N), and metastasis (M). Doctors look at these three factors to determine the stage of cancer:

- How large is the primary tumor, and where is it located?  
**(Tumor, T)**
- Has the tumor spread to the lymph nodes? **(Node, N)**
- Has the cancer spread to other parts of the body?  
**(Metastasis, M)**

**Tumor.** Using the TNM system, the “T” plus a letter or number (0 to 4) is used to describe the size and location of the tumor.

**Nodes.** The “N” in the TNM staging system stands for lymph nodes, the tiny, bean-shaped organs that help fight infection. Lymph nodes near the prostate in the pelvic region are called regional lymph nodes. Lymph nodes in other parts of the body are called distant lymph nodes.

**Distant metastasis.** The “M” in the TNM system indicates whether the prostate cancer has spread to other parts of the body, such as the lungs or the bones.

For specific information on substages for T, N, and M, visit [www.cancer.net/prostate](http://www.cancer.net/prostate).

## Cancer stage grouping

Doctors assign the stage of the cancer by combining the T, N, and M classification; the PSA level; and the Gleason score, which is described on page 11. Find a table with all of the TNM combinations for each stage at [www.cancer.net/prostate](http://www.cancer.net/prostate).

**Stage I:** Cancer is found in the prostate only, usually during another medical procedure. It cannot be felt during the DRE or seen on imaging tests. A stage I cancer is usually made up of cells that look more like normal cells and is likely to grow slowly.

**Stage IIA and IIB:** This stage describes a tumor that is too small to be felt or seen on imaging tests. Or, it describes a slightly larger tumor that can be felt during a DRE. The cancer has not spread outside of the prostate gland, but the cells are usually

more abnormal and may tend to grow more quickly. It has not spread to lymph nodes or distant organs.

**Stage III:** The cancer has spread beyond the outer layer of the prostate into nearby tissues. It may also have spread to the seminal vesicles, the glands in men that help make semen.

**Stage IV:** This stage describes any tumor that has spread to other parts of the body, such as the bladder, rectum, bone, liver, lungs, or lymph nodes.

**Recurrent:** Recurrent prostate cancer is cancer that comes back after treatment. It may come back in the prostate area again or in other parts of the body. If there is a recurrence, the cancer may need to be staged again (re-staging) using the system previously described.

Anatomical and staging illustrations for many types of cancer are available at [www.cancer.net](http://www.cancer.net).

## Prognostic factors

In addition to stage, doctors use other prognostic factors to help plan the best treatment and predict how successful treatment will be. Below are prognostic factors for patients with prostate cancer.

**PSA test.** As described in Risk Factors and Prevention, PSA is a measurement of prostate-specific antigen levels in a man's blood. These results are usually reported as nanograms per milliliter (ng/mL), such as 7 ng/mL for a PSA level of 7. For men already diagnosed with prostate cancer, the PSA level (and the Gleason score) helps the doctor understand and predict a patient's prognosis. This measurement gives doctors more information about the cancer to help make treatment decisions. Some prostate cancers do not cause an increased PSA level, so a normal PSA does not always mean that there is no prostate cancer.

**Gleason score for grading prostate cancer.** Prostate cancer is also given a grade called a Gleason score, which is based on how much the cancer looks like healthy tissue when viewed under a microscope. Less dangerous tumors generally look more like healthy tissue, and more dangerous tumors that are likely to grow and spread to other parts of the body look less like healthy tissue.

The Gleason System is the most common prostate cancer grading system used. The pathologist looks at how the cancer cells are arranged in the prostate and assigns a score on a scale of 1 to 5. Cancer cells that look similar to healthy cells are given a low score, and cancer cells that look less like healthy cells are given a higher score. To assign the numbers, the doctor determines the main pattern of cell growth (area where the cancer is most obvious), looks for any other less common pattern of growth, and gives each one a score. The scores are added to come up

with an overall score between 2 and 10. The interpretation of the Gleason score by doctors has changed recently. Originally, doctors used a wide range of scores. Today, doctors no longer use Gleason scores of 5 or lower for cancer found with a biopsy. The lowest score used is 6, which is a low-grade cancer. A Gleason score of 7 is a medium-grade cancer, and 8, 9, or 10 is a high-grade cancer. A lower-grade cancer grows more slowly and is less likely to spread than a high-grade cancer.

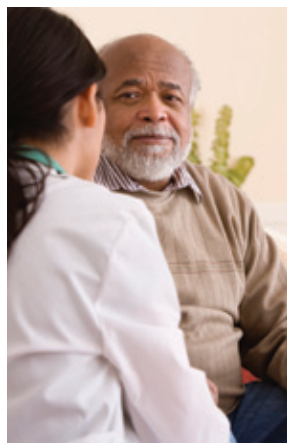
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## TREATMENT

This section outlines treatments that are the standard of care (the best proven treatments available) for this specific type of cancer. When making treatment plan decisions, patients are also encouraged to consider clinical trials as an option. A clinical trial is a research study to test a new treatment to evaluate whether it is safe, effective, and possibly better than standard treatment. Your doctor can help you review all treatment options. For more information, see the Clinical Trials and Current Research sections.

### Treatment overview

In cancer care, different types of doctors often work together to create an overall treatment plan that combines different types of treatments. This is called a multidisciplinary team.



Descriptions of the most common treatment options for prostate cancer are listed in the following pages. Treatment options and recommendations depend on several factors, including the type and stage of cancer, possible side effects, and the patient's preferences and overall health.

It is important to discuss the goals and possible side effects of treatment with your doctor before treatment begins, including the likelihood that the treatment will work, the possible side effects (including urinary, bowel, sexual, and hormone-related side effects), and the patient's preferences. Men should talk with their doctor about how the various treatments affect recurrence, survival, and quality of life. In addition, the success of any treatment often depends on the skill and expertise of the physician or surgeon, so it is important to find doctors who have experience treating prostate cancer.

Learn more about making treatment decisions at [www.cancer.net/features](http://www.cancer.net/features).

## Active surveillance for early-stage cancer

If a prostate cancer is in an early stage, growing slowly, and treating the cancer would cause more discomfort than the disease, a doctor may recommend active surveillance. During active surveillance, the cancer is monitored closely with periodic PSA tests, DRE tests, and watching for symptoms. Treatment would begin only if the tumor shows signs of spreading or becoming more aggressive, causes pain, or blocks the urinary tract. This approach may be used for much older patients, those with other serious or life-threatening illnesses, or those who wish to delay active treatment because of possible side effects. However, real caution must be taken not to make errors of judgment about the disease. In other words, doctors must collect as much information as possible about the patient's other illnesses and life expectancy, so they don't miss the chance to detect an early, aggressive prostate cancer. For this reason, many doctors recommend a repeat biopsy shortly after diagnosis to confirm that the cancer is in an early stage and growing slowly before considering active surveillance for an otherwise healthy man. New information is becoming available all the time, and it is important for men to discuss these issues with their doctor to make the best decisions about treatment.

## Surgery

Surgery is the removal of the tumor and surrounding tissue during an operation. It is used to try to cure cancer before it has spread outside the prostate. A surgical oncologist is a doctor who specializes in treating cancer using surgery. For prostate cancer, a urologist or urologic oncologist is the surgical oncologist involved in treatment. The type of surgery depends on the stage of the disease, the man's general health, and other factors. Surgical options include:

**Radical (open) prostatectomy.** A radical prostatectomy is the surgical removal of the whole prostate and seminal vesicles; lymph nodes in the pelvic area may also be removed. This operation has the risk of interfering with sexual function. Nerve-sparing surgery, when possible, increases the chance that a man can maintain his sexual function after surgery by avoiding surgical damage to the nerves that allow erections and orgasm to occur. Orgasm can occur even if some nerves are cut since these are two separate processes. Urinary incontinence (inability to control urine flow) is also a possible side effect of prostatectomy. To help resume normal sexual function, men can receive drugs, penile implants, or injections. Sometimes, another surgery can fix urinary incontinence.

**Robotic or laparoscopic prostatectomy.** This type of surgery is possibly much less invasive than an open radical prostatectomy and may shorten recovery time. A camera and instruments are inserted through small, keyhole incisions in the patient's abdomen. The surgeon then directs the robotic instruments to remove the prostate gland and surrounding tissue. In general, robotic prostatectomy has less bleeding and



less pain, but sexual and urinary side effects can be similar to an open radical prostatectomy. This procedure has not been available for as long as open radical prostatectomy, so longer-term follow-up information, including permanent cure rates, are not yet certain. Talk with your doctor about whether your treatment center offers this procedure and how it compares with the results of the conventional open radical prostatectomy.

**Transurethral resection of the prostate (TURP).** TURP is most often used to relieve symptoms of a urinary blockage, not to cure cancer. In this procedure, with the patient under a full anesthetic, a surgeon inserts a cystoscope (a narrow tube with a cutting device) into the urethra and into the prostate to remove prostate tissue. This is rarely used to treat prostate cancer.

**Cryosurgery.** Cryosurgery (also called cryotherapy or cryoablation) is the freezing of cancer cells with a metal probe inserted through a small incision in the area between the rectum and the scrotum, the skin sac that contains the testicles. Cryosurgery may be useful for early-stage cancer and for men who cannot have a radical prostatectomy. A common side effect of cryosurgery is impotence, so this approach is not recommended for men who desire to preserve their sexual function. Another side effect may be the development of fistulae (holes between the prostate and the bowel), although this appears to be much less common with newer cryosurgery techniques.

Learn more about cancer surgery at [www.cancer.net/features](http://www.cancer.net/features).

## **Radiation therapy**

Radiation therapy is the use of high-energy rays to kill cancer cells. A doctor who specializes in giving radiation therapy to treat cancer is called a radiation oncologist. The most common type of radiation treatment is called external-beam radiation therapy, which is radiation given from a machine outside the body. When radiation treatment is given using implants, it is called internal radiation therapy or brachytherapy. A radiation therapy regimen (schedule) usually consists of a specific number of treatments given over a set period of time.

**External-beam radiation therapy.** External-beam radiation therapy focuses a beam of radiation on the area with the cancer. Some cancer centers use conformal radiation therapy (CRT), in which computers help precisely map the location and shape of the cancer. CRT reduces radiation damage to healthy tissues and organs around the tumor by directing the radiation therapy beam from different directions to focus the dose on the tumor.

**Intensity-modulated radiation therapy (IMRT).** IMRT is a type of three-dimensional (3-D) CRT. CRT uses CT scans to form a 3-D picture of the prostate before treatment. With IMRT, high doses of radiation can be directed at the prostate without increasing the risk of damaging nearby organs.

**Brachytherapy.** Brachytherapy is the insertion of radioactive sources directly into the prostate. These sources (called seeds) give off radiation just around the area in which they are inserted and may be used for hours (high-dose rate) or for weeks (low-dose rate). Low-dose rate seeds are left in the prostate permanently, even after all the radioactive material has been used up. It is not usually used as the only treatment for a man with a high-risk cancer.

Radiation therapy may cause such side effects as diarrhea or other problems with bowel function; increased urinary urge or frequency; fatigue; impotence (erectile dysfunction); and rectal discomfort, burning, or pain. Most of these side effects usually go away after treatment, but erectile dysfunction is usually permanent.

Learn more about radiation therapy at [www.cancer.net/features](http://www.cancer.net/features).

### **Hormone therapy**

Because prostate cancer growth is driven by male sex hormones called androgens, lowering levels of these hormones can help slow the growth of the cancer. Hormone treatment is also called androgen ablation or androgen-deprivation therapy. The most common androgen is testosterone. Testosterone levels in the body can be lowered either surgically, with surgical castration (removal of the testicles), or with drugs that turn off the function of the testicles.

Hormone therapy is used to treat prostate cancer that has continued to grow after surgery and radiation therapy, or if it has spread throughout the body when diagnosed. More recently, hormone therapy has also been used with radiation therapy for men with a cancer that is more likely to recur. For some men, hormone therapy will be used first to shrink a tumor before radiation therapy or surgery. In some men with prostate cancer that has spread locally, called locally advanced prostate cancer, hormone therapy is given before, during, and after radiation therapy for three years. Hormone therapy is also an option for men who have prostate cancer that has spread to the lymph nodes (found after radical prostatectomy) as adjuvant therapy (treatment that is given after the first treatment). It may also be given for up to three years for men with intermediate-risk or high-risk cancer.

Traditionally, hormone therapy was used until it stopped controlling the cancer. Then the cancer was called hormone refractory (meaning that the hormone therapy has stopped working), and other treatment options were considered. Recently, researchers have begun studying intermittent hormone therapy, which is hormone therapy that is given for specific periods and then stopped temporarily according to a schedule. Giving hormones in this way appears to lower the symptoms of this therapy. In addition, intermittent hormone therapy may

possibly maintain hormone responsiveness for a longer time than standard (continuous) hormone treatment; this approach is currently being tested in clinical trials.

One important side effect of hormone therapy is the risk of developing metabolic syndrome. Metabolic syndrome is a set of conditions, such as high levels of blood cholesterol and high blood pressure that increases a person's risk of heart disease, stroke, and diabetes. Currently, it is not certain how often this happens or exactly why it happens, but it is quite clear that patients who receive a surgical or medical castration (even a temporary medical castration) with hormone therapy have an increased risk of developing metabolic syndrome. The risks and benefits of castration should be carefully discussed with your doctor. For men with metastatic prostate cancer, especially if it is advanced and causing symptoms, most doctors believe that the benefits of castration far outweigh the risks of metabolic syndrome.

### **Types of hormone therapy**

**Bilateral orchiectomy.** Bilateral orchiectomy is the surgical removal of both testicles. Even though this is surgery, it is called a hormone treatment because it removes the main source of testosterone production, the testicles. This surgery is permanent and cannot be reversed.

**LHRH agonists.** LHRH stands for luteinizing hormone-releasing hormone. LHRH agonists are drugs that reduce the body's production of testosterone by interfering with hormonal control mechanisms within the brain, which control the functioning of the testicles.

**Anti-androgens.** While LHRH agonists lower testosterone levels in the blood, anti-androgens block testosterone from binding to so-called "androgen receptors," chemical structures in the cancer cells that allow testosterone and other male hormones to enter the cells.

**LHRH antagonist.** This type of drug, also called a gonadotropin-releasing hormone (GnRH) antagonist, stops the testicles from producing testosterone by acting like LHRH. The U.S. Food and Drug Administration (FDA) has approved one drug, degarelix (Firmagon), given by injection, to treat advanced prostate cancer. One side effect of this drug is that it may cause a severe allergic reaction.

**Female hormones.** Estrogen can lower testosterone levels. When it is given as a pill, side effects can include heart problems and blood clots. More recently, estrogen has been given as injections or as a patch, and this type of treatment may be associated with a lower chance of heart and clotting side effects.

**Combined androgen blockade.** Sometimes, LHRH agonists are used in combination with peripheral-blocking drugs, such

as anti-androgens, to more completely block male hormones. Many doctors feel that this combined approach is the safest way to start hormone treatment, as this prevents a possible flare-up or increase in activity of the prostate cancer cells that sometimes happens because of a temporary surge in testosterone production by the testicles (in response to the LHRH agonists). Major studies have not shown a big difference in long-term survival from the use of combined androgen blockade as permanent therapy; therefore, some doctors prefer to give combined drug treatment only for the first two to three months.

**CYP-17 inhibitors.** CYP-17 inhibitors are a type of hormone therapy that prevents androgen from being made by the body. Abiraterone (Zytiga) is a CYP-17 inhibitor that has been approved by the FDA as a treatment for castration-resistant prostate cancer that has spread when chemotherapy with docetaxel (Docetaxel, Taxotere) has not worked (see Metastatic prostate cancer). Research studies have shown that abiraterone increased survival for men with this type of cancer.

Hormone therapy may cause significant side effects. Side effects generally go away after hormone treatment is finished, except in men who have had an orchiectomy. Patients may experience impotence, loss of libido (sexual desire), hot flashes, gynecomastia (enlarged breasts), and osteoporosis (weakening bones). Although testosterone levels may recover after stopping hormone therapy, some men who have taken LHRH agonists for many years may continue to have hormonal effects, even if the drugs are no longer given.

### **Recurrent prostate cancer**

Once your treatment is complete and there is a remission (absence of cancer symptoms; also called "no evidence of disease" or NED), talk with your doctor about the possibility of the cancer returning. Many survivors feel worried or anxious that the cancer will come back.

Treatments that help prevent a recurrence include androgen deprivation therapy and radiation therapy (see previous sections.).

If the cancer does return after the original treatment, it is called recurrent cancer. It may come back in the same place (called a local recurrence), nearby (regional recurrence), or in another place (distant recurrence). Also, an increasing PSA level may be a sign of prostate cancer recurrence even if no tumor can be found.

When this occurs, a cycle of testing will begin again to learn as much as possible about the recurrence. After testing is done, you and your doctor will talk about your treatment options. Often the treatment plan will include therapies discussed earlier (such as surgery, radiation therapy, and hormone therapy) but may be used in a different combination or given at a different pace. Your doctor may also suggest clinical trials that are studying new ways to treat this type of recurrent cancer.

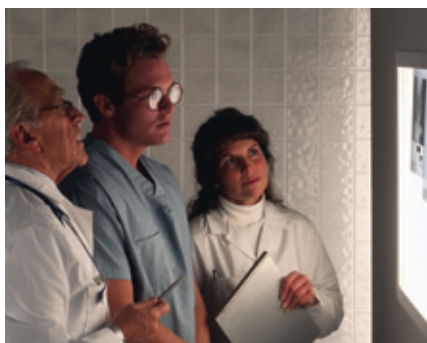
Treatments for recurrent prostate cancer may include androgen deprivation therapy, radiation therapy, or surgery.

People with recurrent cancer often experience emotions such as disbelief or fear. Patients are encouraged to talk with their health care team about these feelings and ask about support services to help them cope.

Learn more about coping with the fear of cancer recurrence at [www.cancer.net/coping](http://www.cancer.net/coping).

## **Metastatic (advanced) prostate cancer**

If cancer has spread to another location in the body, it is called metastatic cancer. The standard treatment for metastatic prostate cancer is hormone therapy. Generally, prostate cancer will develop the ability to grow without using male sex hormones. This is called castration-resistant prostate cancer.



Patients with this diagnosis are encouraged to talk with doctors who are experienced in treating this stage of cancer because there can be different opinions about the best treatment plan. Learn more about seeking a second opinion before starting

treatment, so you are comfortable with the treatment plan chosen. This discussion may include clinical trials. Although there is no cure for advanced prostate cancer, it is often treatable. Many men outlive their prostate cancer, even those with advanced disease. Often, the prostate cancer grows slowly, and there are now effective treatment options that extend life even further.

Your health care team may recommend a treatment plan that includes vaccine therapy with sipuleucel-T (Provenge), chemotherapy with docetaxel, or clinical trials. These treatment options are discussed in more detail below. If you have pain, radiation therapy may also be recommended.

**Vaccine therapy.** Sipuleucel-T (Provenge) is a form of immunotherapy (also called biologic therapy) which is designed to boost the body's natural defenses to fight the cancer. It uses materials made either by the body or in a laboratory to bolster, target, or restore immune system function. Learn more about immunotherapy at [www.cancer.net/immunotherapy](http://www.cancer.net/immunotherapy).

In 2010, the FDA approved sipuleucel-T for men with castration-resistant metastatic prostate cancer with few or no symptoms, because in research studies it increased survival by about four months compared to no treatment. Sipuleucel-T is adapted for each patient. Before treatment, blood is removed from

the patient in a process called leukapheresis. Special immune cells are separated from the patient's blood, modified in the laboratory, and then put back in the patient. At this point, the patient's immune system may recognize and kill the prostate cancer cells. Because this treatment is tailored for each patient, it may not be available in many areas.

These clinical trials were sponsored by drug companies; critics have suggested that the small increase in survival comes at a significant cost, and many doctors are waiting for results of independent clinical trials.

**Chemotherapy.** Chemotherapy is the use of drugs to kill cancer cells, usually by stopping the cancer cells' ability to grow and divide. Systemic chemotherapy is delivered through the bloodstream to reach cancer cells throughout the body. Chemotherapy is given by a medical oncologist, a doctor who specializes in treating cancer with medication. A chemotherapy regimen (schedule) usually consists of a specific number of cycles given over a set period of time. A patient may receive one drug at a time or combinations of different drugs at the same time.

Chemotherapy for prostate cancer is given intravenously (injected into a vein), and it may help patients with advanced or hormone-refractory prostate cancer. There is no standard chemotherapy for prostate cancer, but clinical trials are exploring chemotherapy for advanced prostate cancer. The most popular current approach is the use of a drug called docetaxel given with a steroid called prednisone (multiple brand names). This combination has been shown to help men with advanced prostate cancer live longer than another chemotherapy, mitoxantrone (Novantrone), which is most useful for controlling prostate cancer symptoms.

The FDA has approved the drugs mitoxantrone, docetaxel, and cabazitaxel (Jevtana) for use in men with prostate cancer that is resistant to hormone therapy. Cabazitaxel is similar to docetaxel, but research studies have shown that it can be effective for prostate cancer that is resistant to docetaxel. The side effects are similar to docetaxel and include low white blood cell counts, increased risk of infections, allergic reactions, nausea, vomiting, diarrhea, and kidney and liver problems.

Estramustine (Emcyt), another FDA-approved drug, is being used much less often because of newer drugs that can prolong life and because of its side effects, which include an increased risk of blood clots. Many new medications for prostate cancer are in development and may be available in clinical trials.

The side effects of chemotherapy depend on the individual and the dose used, but they can include fatigue, risk of infection, nausea and vomiting, loss of appetite, and diarrhea. These side effects usually go away once treatment is finished.

Learn more about chemotherapy and preparing for treatment at [www.cancer.net/chemotherapy](http://www.cancer.net/chemotherapy). The medications used to treat cancer are continually being evaluated. Talking with your doctor is often the best way to learn about the medications prescribed for you, their purpose, and their potential side effects or interactions with other medications. Learn more about your prescriptions by using searchable drug databases at [www.cancer.net/druginforesources](http://www.cancer.net/druginforesources).

In addition to treatment to slow, stop, or eliminate the cancer (also called disease-directed treatment), an important part of cancer care is relieving a person's symptoms and side effects. It includes supporting the patient with his or her physical, emotional, and social needs, an approach called palliative or supportive care. People often receive disease-directed therapy and treatment to ease symptoms at the same time.

If disease-directed treatment is not successful, this may also be called resistant or advanced cancer. This diagnosis is stressful, and it may be difficult to discuss. However, it is important to have open and honest conversations with your doctor and health care team to express your feelings, preferences, and concerns. The health care team is there to help, and many team members have special skills, experience, and knowledge to support patients and their families. A few drugs can help treat the symptoms of advanced cancer to enhance the quality of the patient's life.

**Chemotherapy.** Chemotherapy is most commonly used for patients with advanced, hormone-refractory prostate cancer. It can be effective in relieving symptoms, such as pain, weight loss, and fatigue, and may prolong life for some patients.

**Strontium and samarium.** Given by injection, these radioactive substances are absorbed near the area of bone pain. The radiation that is released helps relieve the pain, probably by causing the tumor in the bone to shrink.

**Zoledronic acid (Zometa).** Given by injection, zoledronic acid reduces the level of calcium in the blood and causes fewer bone complications (such as pain, fracture, and need for surgery) from metastases. A high calcium level is called hypercalcemia and is sometimes found in men with advanced prostate cancer.

**Denosumab (Prolia, Xgeva).** Recent research has looked at the use of denosumab to help slow the damage to bone from metastases and reduce bone side effects for men with castration-resistant prostate cancer. Results indicate that denosumab may be more effective at protecting the bones than zoledronic acid.

**Hormone therapy.** Some types of hormone therapy may be used to treat advanced cancer. Read more about hormone



therapy for advanced prostate cancer at [www.cancer.net/whattoknow](http://www.cancer.net/whattoknow).

Learn more about advanced cancer care planning at [www.cancer.net/advancedcancer](http://www.cancer.net/advancedcancer).

## ABOUT CLINICAL TRIALS

Doctors and scientists are always looking for better ways to treat patients with prostate cancer. To make scientific advances, doctors create research studies involving people, called clinical trials.

Many clinical trials are focused on new treatments, evaluating whether a new treatment is safe, effective, and possibly better than the current (standard) treatment. These types of studies evaluate new drugs, different combinations of existing treatments, new approaches to radiation therapy or surgery, and new methods of treatment. Patients who participate in clinical trials are often among the first to receive new treatments before they are widely available. However, there is no guarantee that the new treatment will be safe, effective, or better than a standard treatment.



There are also clinical trials that study new ways to ease symptoms and side effects during treatment and manage late effects that may occur after treatment. Talk with your doctor about clinical trials regarding side effects. In addition, there are ongoing studies about ways to prevent the disease.

Patients decide to participate in clinical trials for many reasons. For some patients, a clinical trial is the best treatment option available. Because standard treatments are not perfect, patients are often willing to face the added uncertainty of a clinical trial in the hope of a better result. Other patients volunteer for clinical trials because they know that these studies are the only way to achieve progress in treating prostate cancer. Even if they do not benefit directly from the clinical trial, their participation may benefit future men with prostate cancer.

Sometimes people have concerns that, by participating in a clinical trial, they may receive no treatment by being given a placebo or a “sugar pill.” The use of placebos in cancer clinical trials is rare. When a placebo is used in a study, it is done with the full knowledge of the participants. Find out more about placebos in cancer clinical trials at [www.cancer.net/features](http://www.cancer.net/features).

To join a clinical trial, patients participate in a process known as informed consent. During informed consent, the doctor should list all of the patient’s options, so that the person understands

how the new treatment differs from the standard treatment. The doctor must also list all of the risks of the new treatment, which may or may not be different from the risks of standard treatment. Finally, the doctor must explain what will be required of each patient in order to participate in the clinical trial, including the number of doctor visits, tests, and the schedule of treatment.

Patients who participate in a clinical trial may stop participating at any time for any personal or medical reason. This may include that the new treatment is not working or there are serious side effects. It is important that patients participating in a clinical trial talk with their doctor and researchers about who will be providing their treatment and care during the clinical trial, after the clinical trial ends, and/or if the patient chooses to leave the clinical trials before it ends.

Learn more about clinical trials, including patient safety, phases of a clinical trial, deciding to participate in a clinical trial, questions to ask the research team, and links to find cancer clinical trials at [www.cancer.net/clinicaltrials](http://www.cancer.net/clinicaltrials).

For specific topics being studied for prostate cancer, learn more in the Current Research section.

## **SIDE EFFECTS**

Cancer and its treatment can cause a variety of side effects. However, doctors have made major strides in recent years in reducing pain, nausea and vomiting, and other physical side effects of cancer treatments. Many treatments used today are less intensive but as effective as treatments used in the past. Doctors also have many ways to provide relief to patients when such side effects occur.

Fear of treatment side effects is common after a diagnosis of cancer, but it may be helpful to know that preventing and controlling side effects is a major focus of your health care team. Before treatment begins, talk with your doctor about possible side effects of the specific treatments you will be receiving. The specific side effects that can occur depend on a variety of factors, including the type of cancer, its location, the individual treatment plan (including the length and dosage of treatment), and your overall health.

Also, be sure to communicate with the doctor about side effects you experience during and after treatment. Care of a patient's symptoms and side effects is an important part of a person's overall treatment plan; this is called palliative or supportive care. Learn more about the most common side effects of cancer and different treatments, along with ways to prevent or control them, at [www.cancer.net/sideeffects](http://www.cancer.net/sideeffects).

Be sure to talk with your doctor about the level of caregiving you may need during treatment and recovery, as family

members and friends often play an important role in the care of a person with prostate cancer. Learn more about caregiving at [www.cancer.net/caregiving](http://www.cancer.net/caregiving).

In addition to physical side effects, there may be psychosocial (emotional and social) effects as well. For many patients, a diagnosis of prostate cancer is stressful and can bring difficult emotions. Patients and their families are encouraged to share their feelings with a member of their health care team who can help with coping strategies. Learn more about the importance of addressing such needs, including concerns about managing the cost of your cancer care, at [www.cancer.net/patientcare](http://www.cancer.net/patientcare) and [www.cancer.net/managingcostofcare](http://www.cancer.net/managingcostofcare).

A side effect that occurs months or years after treatment is called a late effect. Treatment of late effects is an important part of survivorship care. Learn more about late effects or long-term side effects by reading the After Treatment section or talking with your doctor.

## **AFTER TREATMENT**

After treatment for prostate cancer ends, talk with your doctor about developing a follow-up care plan. This plan may include regular physical examinations and/or medical tests to monitor your recovery for the coming months and years. ASCO offers cancer treatment summary forms at [www.cancer.net/treatmentsummaries](http://www.cancer.net/treatmentsummaries) to help keep track of the cancer treatment you received and develop a survivorship care plan once treatment is complete.



Men recovering from prostate cancer are encouraged to follow established guidelines for good health, such as maintaining a healthy weight, not smoking, eating a balanced diet, and having recommended cancer screening tests. Talk with your doctor to develop a plan that is best for your needs. Moderate physical activity can help rebuild your strength and energy level. Your doctor can help you create an appropriate exercise plan based upon your needs, physical abilities, and fitness level.

Learn more about the next steps to take in survivorship, including making positive lifestyle changes at [www.cancer.net/survivors](http://www.cancer.net/survivors) and [www.cancer.net/features](http://www.cancer.net/features).

Find out more about coping with cancer, including important topics for men with prostate cancer, such as self-image and cancer, fertility and cancer treatment, sexual health, and talking with your spouse or partner at [www.cancer.net/coping](http://www.cancer.net/coping).

Learn more about common terms used after cancer treatment is complete at [www.cancer.net/dictionaryresources](http://www.cancer.net/dictionaryresources).

## QUESTIONS TO ASK THE DOCTOR

Talking often with the doctor is important to make informed decisions about your health care. These suggested questions are a starting point to help you learn more about your cancer care and treatment. You are also encouraged to ask additional questions that are important to you.

### **Before diagnosis/risk reduction and screening**

- What type of prostate cancer screening schedule do you recommend for me, based on my individual medical profile and family history?
- Are there any changes I can make to my diet that can help me lower my risk of prostate cancer?

### **After a diagnosis of prostate cancer**

- What type of prostate cancer do I have?
- What stage and grade is my prostate cancer, and what does this mean?
- Can you explain my pathology report (laboratory test results) to me?
- What are my treatment options?
- What clinical trials are open to me?
- What treatment plan do you recommend and why?
- What is the goal of this treatment?
- Who will be part of my health care team, and what does each member do?
- Who will be coordinating my overall treatment and follow-up care?
- What are the possible side effects of each treatment option, both in the short term and the long term?
- What experience do you have in treating this type of cancer?
- How will this treatment affect my daily life? Will I be able to work, exercise, and perform my usual activities?
- Could this treatment affect my sex life?
- Will this treatment affect my fertility (ability to produce children)?
- What type of recovery should I expect following treatment?
- What follow-up care tests will I need, and how often will I need them?
- If I'm worried about managing the costs related to my cancer care, who can help me with these concerns?
- What support services are available to me? To my family?

### **Patient Information Resources**

Find organizations that offer information for prostate cancer at [www.cancer.net/support](http://www.cancer.net/support).

Dear Friend,

From the instant that the word cancer is spoken, life's major and minor chords are played differently.

At the Conquer Cancer Foundation of *the American Society of Clinical Oncology* we are well acquainted with the human cost of cancer. We're working toward conquering this disease, and we're doing all we can to ensure that high-quality information and treatment are accessible to all.

One way we're doing this is by supporting education and **information for patients and physicians worldwide** through Cancer.Net, ASCO's award-winning patient information website. We also support patient information materials found in physicians' office nationwide. And we hold public forums that distill scientific findings from ASCO's Annual Meeting for patients, families, and others from a non-clinical background.

As part of our mission, we will also continue to support **breakthrough research** in every aspect of patients' lives—from prevention through diagnosis, to treatment, end-of-life care, and survivorship.

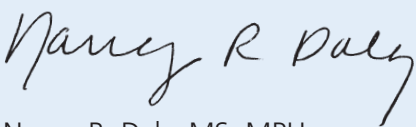
And we will continue to support work toward ensuring that more people have **access to high-quality cancer care** by working to eliminate health disparities in the United States, and by offering professional development opportunities for physicians internationally.

We are committed to strengthening our partnerships with visionary organizations dedicated to working on behalf of all people with cancer, and with generous individuals who contribute their time, talent, and resources to fuel our shared vision of **a world free from the fear of cancer.**

If you are a current supporter of the Conquer Cancer Foundation, **thank you!**

If you have not partnered with the Conquer Cancer Foundation before, visit **[www.ConquerCancerFoundation.org](http://www.ConquerCancerFoundation.org)** to learn more and be a part of our ambitious future.

Warmest Regards,



Nancy R. Daly, MS, MPH  
Executive Director  
Conquer Cancer Foundation of *the American Society of Clinical Oncology*



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[www.asco.org](http://www.asco.org) | [www.cancer.net](http://www.cancer.net)

For more information about ASCO's patient information resources,  
call toll-free 888-651-3038 or e-mail [contactus@cancer.net](mailto:contactus@cancer.net).

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