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What

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You

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Need

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Know

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About™

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# Cancer of the Pancreas

This booklet is about cancer of the pancreas. 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 del páncreas. 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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## What You Need To Know About™ Cancer of the Pancreas

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**T**his National Cancer Institute (NCI) booklet has important information about *cancer\** of the pancreas. In the United States, cancer of the pancreas is diagnosed in more than 29,000 people every year. It is the fifth leading cause of cancer death.

This booklet discusses possible causes of cancer of the pancreas. It also describes symptoms, diagnosis, treatment, and followup care. This information can help patients and their families better understand and cope with this disease.

Scientists are studying cancer of the pancreas to learn more about this disease. They are finding out more about its causes. Doctors are exploring new ways to treat it. Research already has led to better quality of life for people with cancer of the pancreas.

Information specialists at the NCI's Cancer Information Service at 1-800-4-CANCER can help people with questions about cancer and can send NCI publications. Also, many NCI publications are on the Internet at <http://cancer.gov/publications>. People in the United States and its territories may use this Web site to order publications. This Web site also explains how people outside the United States can mail or fax their requests for NCI publications.

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\*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.

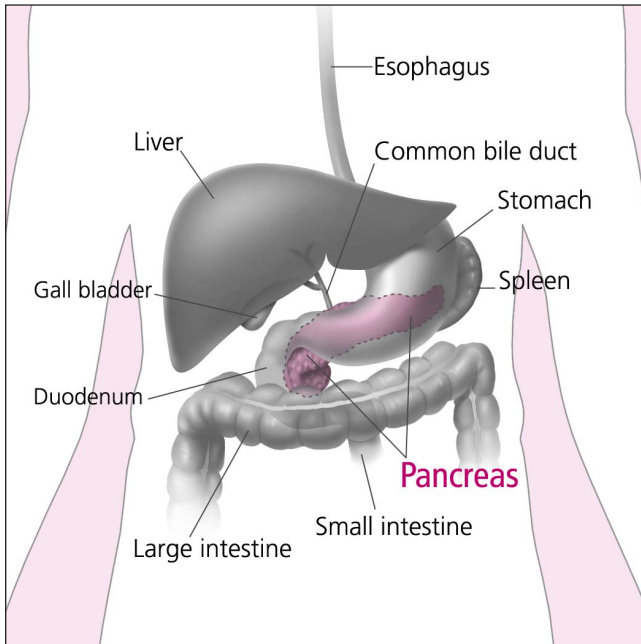
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## The Pancreas

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**T**he *pancreas* is a *gland* located deep in the *abdomen* between the stomach and the spine (backbone). The *liver*, *intestine*, and other organs surround the pancreas.

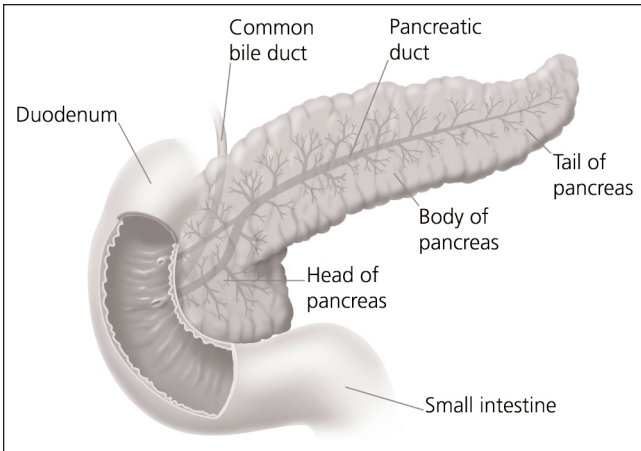
The pancreas is about 6 inches long and is shaped like a flat pear. The widest part of the pancreas is the head, the middle section is the body, and the thinnest part is the tail.



This picture shows the pancreas and nearby organs.

The pancreas makes *insulin* and other *hormones*. These hormones enter the bloodstream and travel throughout the body. They help the body use or store the energy that comes from food. For example, insulin helps control the amount of sugar in the blood.

The pancreas also makes *pancreatic juices*. These juices contain *enzymes* that help digest food. The pancreas releases the juices into a system of *ducts* leading to the *common bile duct*. The common bile duct empties into the *duodenum*, the first section of the small intestine.



This picture shows the pancreas, common bile duct, and small intestine.

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## Understanding Cancer

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**C**ancer 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 breaks down. New cells form when the body does not need them, or 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. In most cases, benign tumors do not come back after they are removed. Cells from benign tumors do not spread to tissues around them or to other parts of the body. Most important, benign tumors are rarely a threat to life.
- **Malignant tumors** are cancer. They are generally more serious and may be life threatening. 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 cancer (*primary tumor*) to form new tumors in other organs. The spread of cancer is called *metastasis*.

Most pancreatic cancers begin in the ducts that carry pancreatic juices. Cancer of the pancreas may be called *pancreatic cancer* or *carcinoma* of the pancreas.

A rare type of pancreatic cancer begins in the cells that make insulin and other hormones. Cancer that begins in these cells is called *islet cell cancer*. This booklet does not deal with this rare disease. The Cancer Information Service (1-800-4-CANCER) can provide information about islet cell cancer.

When cancer of the pancreas spreads (*metastasizes*) outside the pancreas, cancer cells are often found in nearby *lymph nodes*. If the cancer has reached these nodes, it means that cancer cells may have spread to other lymph nodes or other tissues, such as the liver or lungs. Sometimes cancer of the pancreas spreads to the *peritoneum*, the tissue that lines the abdomen.

When cancer spreads 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 cancer of the pancreas spreads to the liver, the cancer cells in the liver are pancreatic cancer cells. The disease is metastatic pancreatic cancer, not liver cancer. It is treated as pancreatic cancer, not liver cancer.

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## Pancreatic Cancer: Who's at Risk?

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**N**o one knows the exact causes of pancreatic cancer. Doctors can seldom explain why one person gets pancreatic cancer and another does not. However, it is clear that this disease is not contagious. No one can “catch” cancer from another person.

Research has shown that people with certain *risk factors* are more likely than others to develop pancreatic cancer. A risk factor is anything that increases a person's chance of developing a disease.



Studies have found the following risk factors:

- **Age**—The likelihood of developing pancreatic cancer increases with age. Most pancreatic cancers occur in people over the age of 60.
- **Smoking**—Cigarette smokers are two or three times more likely than nonsmokers to develop pancreatic cancer.
- **Diabetes**—Pancreatic cancer occurs more often in people who have diabetes than in people who do not.
- **Being male**—More men than women are diagnosed with pancreatic cancer.
- **Being African American**—African Americans are more likely than Asians, Hispanics, or whites to get pancreatic cancer.
- **Family history**—The risk for developing pancreatic cancer triples if a person’s mother, father, sister, or brother had the disease. Also, a family history of colon or ovarian cancer increases the risk of pancreatic cancer.
- **Chronic pancreatitis**—Chronic pancreatitis is a painful condition of the pancreas. Some evidence suggests that chronic pancreatitis may increase the risk of pancreatic cancer.

Other studies suggest that exposure to certain chemicals in the workplace or a diet high in fat may increase the chance of getting pancreatic cancer.

Most people with known risk factors do not get pancreatic cancer. On the other hand, many who do get the disease have none of these factors. People who think they may be at risk for pancreatic 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.

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## Symptoms

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**P**ancreatic cancer is sometimes called a “silent disease” because early pancreatic cancer often does not cause *symptoms*. But, as the cancer grows, symptoms may include:

- Pain in the upper abdomen or upper back
- Yellow skin and eyes, and dark urine from *jaundice*
- Weakness
- Loss of appetite
- Nausea and vomiting
- Weight loss

These symptoms are not sure signs of pancreatic cancer. An infection or other problem could also cause these symptoms. Only a doctor can diagnose the cause of a person’s symptoms. Anyone with these symptoms should see a doctor so that the doctor can treat any problem as early as possible.

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## Diagnosis

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**I**f a patient has symptoms that suggest pancreatic cancer, the doctor asks about the patient’s medical history. The doctor may perform a number of procedures, including one or more of the following:

- **Physical exam**—The doctor examines the skin and eyes for signs of jaundice. The doctor then feels the abdomen to check for changes in the area near the pancreas, liver, and *gallbladder*. The doctor also checks for *ascites*, an abnormal buildup of fluid in the abdomen.



- **Lab tests**—The doctor may take blood, urine, and stool samples to check for *bilirubin* and other substances. Bilirubin is a substance that passes from the liver to the gallbladder to the intestine. If the common bile duct is blocked by a tumor, the bilirubin cannot pass through normally. Blockage may cause the level of bilirubin in the blood, stool, or urine to become very high. High bilirubin levels can result from cancer or from noncancerous conditions.
- **CT scan (Computed tomography)**—An x-ray machine linked to a computer takes a series of detailed pictures. The x-ray machine is shaped like a donut with a large hole. The patient lies on a bed that

passes through the hole. As the bed moves slowly through the hole, the machine takes many x-rays. The computer puts the x-rays together to create pictures of the pancreas and other organs and blood vessels in the abdomen.

- **Ultrasonography**—The ultrasound device uses sound waves that cannot be heard by humans. The sound waves produce a pattern of echoes as they bounce off internal organs. The echoes create a picture of the pancreas and other organs inside the abdomen. The echoes from tumors are different from echoes made by healthy tissues.

The ultrasound procedure may use an external or internal device, or both types:

- **Transabdominal ultrasound:** To make images of the pancreas, the doctor places the ultrasound device on the abdomen and slowly moves it around.
- **EUS (*endoscopic ultrasound*):** The doctor passes a thin, lighted tube (*endoscope*) through the patient’s mouth and stomach, down into the first part of the small intestine. At the tip of the endoscope is an ultrasound device. The doctor slowly withdraws the endoscope from the intestine toward the stomach to make images of the pancreas and surrounding organs and tissues.
- **ERCP (*endoscopic retrograde cholangiopancreatography*)**—The doctor passes an endoscope through the patient’s mouth and stomach, down into the first part of the small intestine. The doctor slips a smaller tube (catheter) through the endoscope into the bile ducts and *pancreatic ducts*. After injecting dye through the catheter into the ducts, the doctor takes x-ray pictures. The x-rays can show whether the ducts are narrowed or blocked by a tumor or other condition.

- **PTC (*percutaneous transhepatic cholangiography*)**—A dye is injected through a thin needle inserted through the skin into the liver. Unless there is a blockage, the dye should move freely through the bile ducts. The dye makes the bile ducts show up on x-ray pictures. From the pictures, the doctor can tell whether there is a blockage from a tumor or other condition.
- **Biopsy**—In some cases, the doctor may remove tissue. A *pathologist* then uses a microscope to look for cancer cells in the tissue. The doctor may obtain tissue in several ways. One way is by inserting a needle into the pancreas to remove cells. This is called *fine-needle aspiration*. The doctor uses x-ray or ultrasound to guide the needle. Sometimes the doctor obtains a sample of tissue during EUS or ERCP. Another way is to open the abdomen during an operation.

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

- What kind of biopsy will I have?
- How long will it take? Will I be awake? Will it hurt?
- Are there any risks?
- How soon will I know the results?
- If I do have cancer, who will talk to me about treatment? When?

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## Staging

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**W**hen pancreatic 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 the size of the tumor in the pancreas, whether the cancer has spread, and, if so, to what parts of the body.

The doctor may determine the stage of pancreatic cancer at the time of diagnosis, or the patient may need to have more tests. Such tests may include blood tests, a CT scan, ultrasonography, *laparoscopy*, or *angiography*. The test results will help the doctor decide which treatment is appropriate.

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## Treatment

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**M**any people with pancreatic cancer want to take an active part in making 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 may 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.

Cancer of the pancreas is very hard to control with current treatments. For that reason, many doctors encourage patients with this disease to consider taking part in a *clinical trial*. Clinical trials are an important option for people with all stages of pancreatic cancer.

The section on “The Promise of Cancer Research” has more information about clinical trials.

At this time, pancreatic cancer can be cured only when it is found at an early stage, before it has spread. However, other treatments may be able to control the disease and help patients live longer and feel better. When a cure or control of the disease is not possible, some patients and their doctors choose *palliative therapy*. Palliative therapy aims to improve *quality of life* by controlling pain and other problems caused by this disease.

The doctor may refer patients to an *oncologist*, a doctor who specializes in treating cancer, or patients may ask for a referral. Specialists who treat pancreatic cancer include *surgeons*, *medical oncologists*, and



*radiation oncologists*. 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 the disease.

## Getting a Second Opinion

Before starting treatment, a patient may want a second opinion about the diagnosis 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 to get another opinion will not make therapy less helpful.

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

- The doctor may refer patients to one or more specialists. At cancer centers, several specialists often work together as a team.
- The Cancer Information Service (1-800-4-CANCER) can tell callers about treatment facilities, including cancer centers and other programs supported by the National Cancer Institute, and can send printed information about finding a doctor.
- A local medical society, a nearby hospital, or a medical school can usually provide the name of specialists.
- The *Official ABMS Directory of Board Certified Medical Specialists* lists doctors' names along with their specialty and their educational background. This resource is available in most public libraries. The American Board of Medical Specialties (ABMS) also offers information by telephone and on the Internet. The public may use these services to



check whether a doctor 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 can describe treatment choices and discuss the results expected with each treatment option. The doctor and patient can work together to develop a treatment plan that fits the patient's needs.

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

- What is the diagnosis?
- Where in the pancreas did the cancer start?
- Is there any evidence the cancer has spread?  
What is the stage of the disease?
- Do I need any more tests to check whether the disease has spread?
- 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?
- Would a clinical trial (research study) be appropriate for me?

Treatment depends on where in the pancreas the tumor started and whether the disease has spread. When planning treatment, the doctor also considers other factors, including the patient's age and general health.

People do not need to ask all of their questions or understand all of the answers at one time. 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 pancreatic cancer may have several treatment options. Depending on the type and stage, pancreatic cancer may be treated with *surgery*, *radiation therapy*, or *chemotherapy*. Some patients have a combination of therapies.

**Surgery** may be used alone or in combination with radiation therapy and chemotherapy.

The surgeon may remove all or part of the pancreas. The extent of surgery depends on the location and size of the tumor, the stage of the disease, and the patient's general health.

- **Whipple procedure:** If the tumor is in the head (the widest part) of the pancreas, the surgeon removes the head of the pancreas and part of the small intestine, bile duct, and stomach. The surgeon may also remove other nearby tissues.
- **Distal pancreatectomy:** The surgeon removes the body and tail of the pancreas if the tumor is in either of these parts. The surgeon also removes the *spleen*.
- **Total pancreatectomy:** The surgeon removes the entire pancreas, part of the small intestine, a portion of the stomach, the common bile duct, the gallbladder, the spleen, and nearby lymph nodes.

Sometimes the cancer cannot be completely removed. But if the tumor is blocking the common bile duct or duodenum, the surgeon can create a *bypass*. A bypass allows fluids to flow through the digestive tract. It can help relieve jaundice and pain resulting from a blockage.

The doctor sometimes can relieve blockage without doing bypass surgery. The doctor uses an endoscope to place a *stent* in the blocked area. A stent is a tiny plastic or metal mesh tube that helps keep the duct or duodenum open.

After surgery, some patients are fed liquids *intravenously* (by IV) and through feeding tubes placed into the abdomen. Patients slowly return to eating solid foods by mouth. A few weeks after surgery, the feeding tubes are removed.

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

- What kind of operation will I have?
- How will I feel after the operation?
- How will you treat my pain?
- What other treatment will I need?
- How long will I be in the hospital?
- Will I need a feeding tube after surgery? Will I need a special diet?
- What are the long-term effects?
- When can I get back to my normal activities?
- How often will I need checkups?

**Radiation therapy** (also called radiotherapy) uses high-energy rays to kill cancer cells. A large machine directs radiation at the abdomen. Radiation therapy may be given alone, or with surgery, chemotherapy, or both.

Radiation therapy is *local therapy*. It affects cancer cells only in the treated area. For radiation therapy, patients go to the hospital or clinic, often 5 days a week for several weeks.

Doctors may use radiation to destroy cancer cells that remain in the area after surgery. They also use radiation to relieve pain and other problems caused by the cancer.

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

- Why do I need this treatment?
- 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 therapy? Are there certain foods that I should eat or avoid?
- How will we know if the radiation is working?
- Will I be able to continue my normal activities during treatment?

**Chemotherapy** is the use of drugs to kill cancer cells. Doctors also give chemotherapy to help reduce pain and other problems caused by pancreatic cancer. It may be given alone, with radiation, or with surgery and radiation.

Chemotherapy is *systemic therapy*. The doctor usually gives the drugs by injection. Once in the bloodstream, the drugs travel throughout the body.

Usually chemotherapy is an *outpatient* treatment given at the hospital, clinic, doctor's office, or home. However, depending on which drugs are given and the patient's general health, the patient may need to stay in the hospital.

Patients may want to ask these questions about chemotherapy:

- Why do I need this treatment?
- What will it do?
- What drugs will I be taking? How will they be given? Will I need to stay in the hospital?
- Will the treatment cause side effects? What can I do about them?
- How long will I be on this treatment?

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## Side Effects of Treatment

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**B**ecause cancer treatment may damage healthy cells and tissues, unwanted side effects are common. 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. The health care team will explain possible side effects 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 sections called “National Cancer Institute Information Resources” and “National Cancer Institute Booklets” for other sources of information about side effects.

### **Surgery**

Surgery for pancreatic cancer is a major operation. Patients need to stay in the hospital for several days afterward. Patients may feel weak or tired. Most need to rest at home for about a month. The length of time it takes to regain strength varies.

The side effects of surgery depend on the extent of the operation, the person’s general health, and other factors. Most patients have pain for the first few days after surgery. Pain can be controlled with medicine, and patients should discuss pain relief with the doctor or nurse. The section on “Pain Control” has more information.

Removal of part or all of the pancreas may make it hard for a patient to digest foods. The health care team can suggest a diet plan and medicines to help relieve diarrhea, pain, cramping, or feelings of fullness.

During the recovery from surgery, the doctor will carefully monitor the patient's diet and weight. At first, a patient may have only liquids and may receive extra nourishment intravenously or by feeding tube into the intestine. Solid foods are added to the diet gradually.

Patients may not have enough pancreatic enzymes or hormones after surgery. Those who do not have enough insulin may develop diabetes. The doctor can give the patient insulin, other hormones, and enzymes. The section "Nutrition for Cancer Patients" has more information.

## **Radiation Therapy**

Radiation therapy may cause patients to become very tired as treatment continues. Resting is important, but doctors usually advise patients to try to stay as active as they can. In addition, when patients receive radiation therapy, the skin in the treated area may sometimes become red, dry, and tender.

Radiation therapy to the abdomen may cause nausea, vomiting, diarrhea, or other problems with digestion. The health care team can offer medicine or suggest diet changes to control these problems. For most patients, the side effects of radiation therapy go away when treatment is over.

## **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.

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, diarrhea, or mouth sores. Usually, these side effects go away gradually during the recovery periods between treatments or after treatment is over. The health care team can suggest ways to relieve side effects.

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## Pain Control

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**P**ain is a common problem for people with pancreatic cancer. The tumor can cause pain by pressing against nerves and other organs.

The patient's doctor or a specialist in pain control can relieve or reduce pain in several ways:

- **Pain medicine**—Medicines often can relieve pain. (These medicines may make people drowsy and constipated, but resting and taking laxatives can help.)
- **Radiation**—High-energy rays can help relieve pain by shrinking the tumor.
- **Nerve block**—The doctor may inject alcohol into the area around certain nerves in the abdomen to block the feeling of pain.
- **Surgery**—The surgeon may cut certain nerves to block pain.

The doctor may suggest other ways to relieve or reduce pain. For example, massage, *acupuncture*, or *acupressure* may be used along with other approaches to help relieve pain. Also, the patient may learn relaxation techniques such as listening to slow music or breathing slowly and comfortably.



More information about pain control can be found in the NCI publications called *Pain Control: A Guide for People with Cancer and Their Families*, *Get Relief from Cancer Pain*, and *Understanding Cancer Pain*. The Cancer Information Service can send these booklets.

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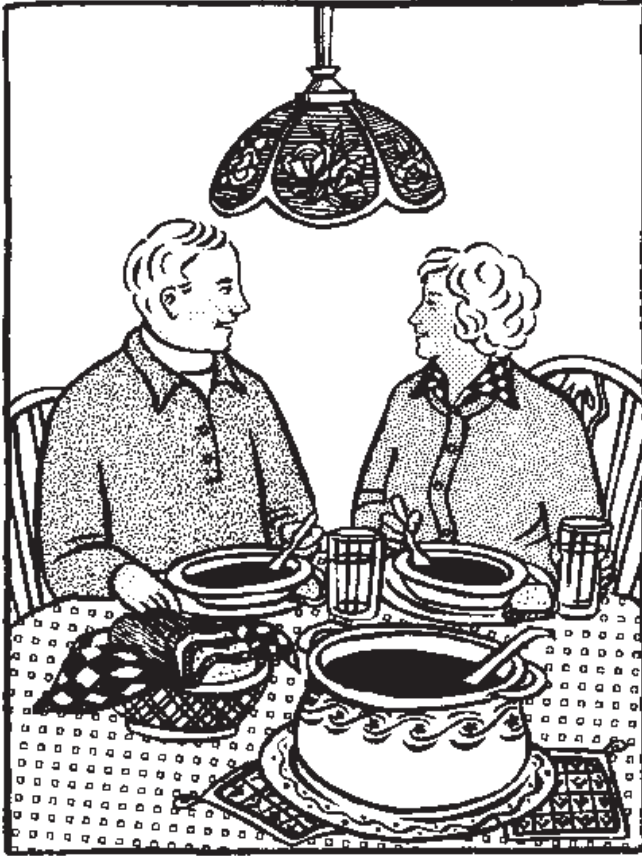
## Nutrition

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**P**eople with pancreatic cancer may not feel like eating, especially if they are uncomfortable or tired. Also, the side effects of treatment such as poor appetite, nausea, or vomiting can make eating difficult. Foods may taste different. Nevertheless, patients should try to get enough calories and protein to control weight loss, maintain strength, and promote healing. Also, eating well often helps people with cancer feel better and have more energy.

Careful planning and checkups are important. Cancer of the pancreas and its treatment may make it hard for patients to digest food and maintain the proper blood sugar level. The doctor will check the patient for weight loss, weakness, and lack of energy. Patients may need to take medicines to replace the enzymes and hormones made by the pancreas. The doctor will watch the patient closely and adjust the doses of these medicines.

The doctor, dietitian, or other health care provider can advise patients about 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 suggestions and recipes. The “National Cancer Institute Booklets” section tells how to get this publication.




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## Followup Care

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**F**ollowup care after treatment for pancreatic cancer is an important part of the overall treatment plan. Patients should not hesitate to discuss followup with their doctor. Regular checkups ensure that any changes in health are noticed. Any problem that develops can be found and treated. Checkups may include a physical exam, laboratory tests, and *imaging procedures*.

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## Support for People with Pancreatic Cancer

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**L**iving with a serious disease such as pancreatic 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 their 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 pancreatic cancer may worry about the future. They may worry about caring for themselves or their families, keeping their jobs, or continuing 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 can answer questions about treatment, diet, working, or other matters. 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 financial aid, transportation, home care, emotional support, or other services.

Materials on coping with cancer 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, services, and publications.

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## The Promise of Cancer Research

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**L**aboratory scientists are studying the pancreas to learn more about it. They are studying the possible causes of pancreatic cancer and are researching new ways to detect tumors. They also are looking for new therapies that may kill cancer cells.

Doctors in clinics and hospitals are conducting many types of clinical trials. These are research studies in which people take part voluntarily. In these trials, researchers are studying ways to treat pancreatic cancer. Research already has led to advances in treatment methods, and researchers continue to search for more effective approaches to treat this disease.

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 very careful steps to protect their patients.

In trials with people who have pancreatic cancer, doctors are studying new drugs, new combinations of chemotherapy, and combinations of chemotherapy and radiation before and after surgery.

*Biological therapy* is also under investigation. Scientists are studying several cancer *vaccines* to help the immune system fight cancer. Other studies use *monoclonal antibodies* to slow or stop the growth of cancer.

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 research studies work and explains their possible

benefits and risks. NCI's cancerTrials™ Web site at <http://cancertrials.nci.nih.gov> on the Internet provides general information about clinical trials. It also offers detailed information about specific ongoing studies of pancreatic cancer by linking to PDQ®, NCI's cancer information database. The Cancer Information Service at 1-800-4-CANCER can answer questions about cancer clinical trials and can provide information from the PDQ database.

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## Dictionary

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

**Acupressure**: The application of pressure or localized massage to specific sites on the body to control symptoms such as pain or nausea. Also used to stop bleeding.

**Acupuncture**: The technique of inserting thin needles through the skin at specific points on the body to control pain and other symptoms.

**Angiography** (an-jee-AH-gra-fee): A procedure to x-ray blood vessels. The blood vessels can be seen because of an injection of a dye that shows up in the x-ray pictures.

**Ascites** (ah-SYE-teez): Abnormal buildup of fluid in the abdomen.

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

**Bilirubin** (bil-ih-ROO-bun): Substance formed when red blood cells are broken down. Bilirubin is stored in the gallbladder. The abnormal buildup of bilirubin causes jaundice.

**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.

**Bypass**: A surgical procedure in which the doctor creates a new pathway for the flow of body fluids.

**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.

**Carcinoma**: (kar-sin-O-ma): Cancer that begins in the skin or in tissues that line or cover internal organs.

**Cell**: The individual unit that makes up all of the tissues of the body. All living things are made up of one or more cells.

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

**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.

**Common bile duct**: Carries bile from the liver and gallbladder into the duodenum (the upper part of the small intestine).

**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

**Diabetes** (dye-a-BEE-teez): A disease in which the body does not properly control the amount of sugar in the blood. As a result, the level of sugar in the blood is too high. This disease occurs when the body does not produce enough insulin or does not use it properly.

**Distal pancreatectomy** (pan-kree-a-TEK-toe-mee): Removal of the body and tail of the pancreas.

**Duct** (dukt): A tube through which body fluids pass.

**Duodenum** (doo-ah-DEE-num): The first part of the small intestine.

**Endoscope** (EN-dah-skope): A thin, lighted tube used to look at tissues inside the body.

**Endoscopic retrograde cholangiopancreatography** (en-dah-SKAH-pik RET-ro-grade ko-LAN-jee-o-PAN-kree-a-TOG-ra-fee): ERCP. A procedure to x-ray the pancreatic duct, hepatic duct, common bile duct, duodenal papilla, and gallbladder. In this procedure, a thin, lighted tube (endoscope) is passed through the mouth and down into the first part of the small intestine (duodenum). A smaller tube (catheter) is then inserted through the endoscope into the bile and pancreatic ducts. A dye is injected through the catheter into the ducts, and an x-ray is taken.

**Endoscopic ultrasound** (en-dah-SKAH-pik): EUS. A procedure in which sound waves (called ultrasound) are bounced off internal organs to make a picture (sonogram). A thin, lighted tube (endoscope) is passed through the mouth and down into the digestive tract.

**Enzyme:** A protein that speeds up chemical reactions in the body.

***Fine-needle aspiration:*** The removal of tissue or fluid with a needle for examination under a microscope. Also called needle biopsy.

***Gallbladder*** (GAWL-blad-er): The pear-shaped organ found below the liver. Bile is concentrated and stored in the gallbladder.

***Gland:*** An organ that produces and releases one or more substances for use in the body. Some glands produce fluids that affect tissues or organs. Others produce hormones.

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

***Imaging procedures:*** Methods of producing pictures of areas inside the body.

***Insulin*** (IN-su-lin): A hormone made by the islet cells of the pancreas. Insulin controls the amount of sugar in the blood by moving it into the cells, where it can be used by the body for energy.

***Intestine*** (in-TES-tin): A long, tube-shaped organ in the abdomen that completes the process of digestion. There is both a large intestine and a small intestine. Also called the bowel.

***Intravenous*** (in-tra-VEE-nus): IV. Within a blood vessel.

***Islet cell cancer*** (EYE-let): Cancer arising from cells in the islets of Langerhans, which are found in the pancreas. Also called endocrine cancer.

***Jaundice*** (JAWN-dis): A condition in which the skin and the whites of the eyes become yellow, urine darkens, and the color of stool becomes lighter than normal. Jaundice occurs when the liver is not working properly or when a bile duct is blocked.



**Laparoscopy** (lap-a-RAHS-ko-pee): The insertion of a thin, lighted tube (called a laparoscope) through the abdominal wall to inspect the inside of the abdomen and remove tissue samples.

**Liver:** A large, glandular organ located in the upper abdomen. The liver cleanses the blood and aids in digestion by secreting bile.

**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 a network of thin tubes that carry lymph and white blood cells. These tubes branch, like blood vessels, into all of the tissues of 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.

**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 (meh-TAS-ta-seez).

***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.

***Monoclonal antibodies*** (MAH-no-KLO-nul AN-tih-BAH-deez): Laboratory-produced substances that can locate and bind to cancer cells wherever they are in the body. Many monoclonal antibodies are used in cancer detection or therapy; each one recognizes a different protein on certain cancer cells. Monoclonal antibodies can be used alone, or they can be used to deliver drugs, toxins, or radioactive material directly to a tumor.

***Oncologist*** (on-KOL-o-jist): A doctor who specializes in treating cancer. Some oncologists specialize in a particular type of cancer treatment. For example, a radiation oncologist specializes in treating cancer with radiation.

***Outpatient***: A patient who visits a health care facility for diagnosis or treatment without spending the night. Sometimes called a day patient.

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

***Pancreas***: A glandular organ located in the abdomen. It makes pancreatic juices, which contain enzymes that aid in digestion, and it produces several hormones, including insulin. The pancreas is surrounded by the stomach, intestines, and other organs.

***Pancreatectomy*** (pan-kree-a-TEK-toe-mee): Surgery to remove the pancreas. In a total pancreatectomy, a portion of the stomach, the duodenum, common bile duct, gallbladder, spleen, and nearby lymph nodes also are removed.

***Pancreatic cancer:*** A disease in which malignant (cancer) cells are found in the tissues of the pancreas. Also called exocrine cancer.

***Pancreatic ducts:*** A system of ducts in the pancreas. Pancreatic juices containing enzymes are released into these ducts and flow into the small intestine.

***Pancreatic juices:*** Fluids made by the pancreas. Pancreatic juices contain proteins called enzymes that aid in digestion.

***Pancreatitis:*** Inflammation of the pancreas. Chronic pancreatitis may cause diabetes and problems with digestion. Pain is the primary symptom.

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

***Percutaneous transhepatic cholangiography*** (per-kyoo-TAY-nee-us trans-heh-PAT-ik ko-LAN-jee-AH-gra-fee): A procedure to x-ray the hepatic and common bile ducts. A contrasting agent is injected into the liver or bile duct, and the ducts are then x-rayed to find the point of obstruction. Also called PTC.

***Peritoneum*** (PAIR-ih-toe-NEE-um): The tissue that lines the abdominal wall and covers most of the organs in the abdomen.

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

***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.

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

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

**Spleen:** An organ that is part of the lymphatic system. The spleen produces lymphocytes, filters the blood, stores blood cells, and destroys old blood cells. It is located on the left side of the abdomen near the stomach.

**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.

**Stent:** A device placed in a body structure (such as a blood vessel or the gastrointestinal tract) to provide support and keep the structure open.

**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. An operation.

***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 using 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.

***Total pancreatectomy:*** Surgery to remove the entire pancreas.

***Transabdominal ultrasound:*** A procedure used to examine the organs in the abdomen. The ultrasound device is pressed firmly against the skin of the abdomen. Sound waves from the device bounce off tissues and create echoes. A computer uses the echoes to make a picture called a sonogram.

***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).

***Ultrasonography*** (UL-tra-son-OG-ra-fee): A procedure in which sound waves (called ultrasound) are bounced off tissues and the echoes produce a picture (sonogram).

***Vaccine:*** A substance or group of substances meant to cause the immune system to respond to a tumor or to microorganisms, such as bacteria or viruses.

***Whipple procedure:*** A type of surgery used to treat pancreatic cancer. The head of the pancreas, the duodenum, a portion of the stomach, and other nearby tissues are removed.

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## National Cancer Institute Information Resources

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**Y**ou 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 a trial, 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, genetics, supportive care, and clinical trials; CANCERLIT®, a bibliographic database; and a dictionary of medical terms related to cancer and its treatment.

## 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 hand set and follow the recorded instructions.

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## National Cancer Institute Booklets

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**N**ational Cancer Institute (NCI) publications can be ordered by writing to the address below, and some can be viewed and downloaded from <http://cancer.gov/publications> on the Internet.

Publications Ordering Service  
National Cancer Institute  
Building 31, Room 10A31  
31 Center Drive, MSC 2580  
Bethesda, MD 20892-2580

In addition, people in the United States and its territories may order these and other NCI booklets by calling the Cancer Information Service at 1-800-4-CANCER. They may also order many NCI publications on-line at <http://cancer.gov/publications>.

## Booklets About Cancer Treatment

- *Chemotherapy and You: A Guide to Self-Help During Treatment*
- *Eating Hints for Cancer Patients*
- *Get Relief from Cancer Pain*
- *Understanding Cancer Pain*
- *Pain Control: A Guide for People with Cancer and Their Families*
- *Help Yourself During Chemotherapy: 4 Steps for Patients*
- *Radiation Therapy and You: A Guide to Self-Help During Treatment*
- *Taking Part in Clinical Trials: What Cancer Patients Need To Know*
- *La quimioterapia y usted: Una guía de autoayuda durante el tratamiento del cáncer (Chemotherapy and You: A Guide to Self-Help During Treatment for Cancer)*
- *El dolor relacionado con el cáncer (Understanding Cancer Pain)*
- *El tratamiento de radioterapia: Guía para el paciente durante el tratamiento (Radiation 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**

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

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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