

National Cancer Institute

What You Need
To Know About¹

Cancer of the Pancreas

U.S. DEPARTMENT OF
HEALTH AND HUMAN SERVICES

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National Institutes of Health

National Cancer Institute Services

This is only one of many free booklets for people with cancer.

You may want more information for yourself, your family, and your doctor.

NCI offers comprehensive research-based information for patients and their families, health professionals, cancer researchers, advocates, and the public.

- **Call** NCI's Cancer Information Service at **1-800-4-CANCER (1-800-422-6237)**
- **Visit** us at **<http://www.cancer.gov>** or **<http://www.cancer.gov/espanol>**
- **Chat** using **LiveHelp**, NCI's instant messaging service, at **<http://www.cancer.gov/livehelp>**
- **E-mail** us at **cancergovstaff@mail.nih.gov**
- **Order** publications at **<http://www.cancer.gov/publications>** or by calling **1-800-4-CANCER**
- **Get help** with quitting smoking at **1-877-44U-QUIT (1-877-448-7848)**

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About This Booklet

This National Cancer Institute (NCI) booklet is about *cancer** that starts in the *pancreas*. This disease is also called *pancreatic cancer*.

Each year in the United States, more than 43,000 people are diagnosed with cancer of the pancreas. Most are over 65 years old.

There are two main types of pancreatic cancer.

Most often, pancreatic cancer starts in the *ducts* that carry *pancreatic juices*. This type is called **exocrine pancreatic cancer**. This booklet is about this type.

Much less often, pancreatic cancer begins in the *cells* that make *hormones*. This type may be called **endocrine pancreatic cancer** or *islet cell cancer*. This booklet is not about endocrine pancreatic cancer. NCI's Cancer Information Service at **1-800-4-CANCER (1-800-422-6237)** can provide information about this disease.

Learning about medical care for cancer of the pancreas can help you take an active part in making choices about your care. This booklet tells about

- Diagnosis and staging
- Treatment and *supportive care*
- Taking part in research studies

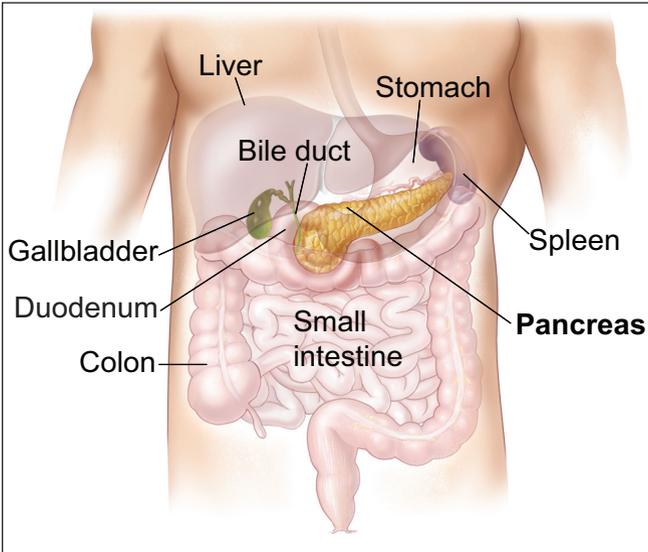
*Words in *italics* are in the Dictionary on page 30. The Dictionary explains these terms. It also shows how to pronounce them.

This booklet has lists of questions that you may want to ask your doctor. Many people find it helpful to take a list of questions to a doctor visit. To help remember what your doctor says, you can take notes. You may also want to have a family member or friend go with you when you talk with the doctor—to take notes, ask questions, or just listen.

For the latest information about cancer of the pancreas, please visit NCI's Web site at **<http://www.cancer.gov/cancertopics/types/pancreatic>**. Also, NCI's Cancer Information Service can answer your questions about cancer. We can also send you NCI booklets and fact sheets. Call **1-800-4-CANCER (1-800-422-6237)** or chat with us online using **LiveHelp**, NCI's instant messaging service, at **<http://www.cancer.gov/livehelp>**.

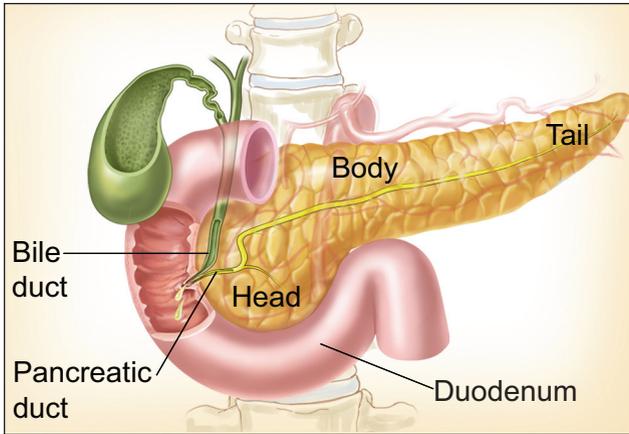
The Pancreas

The pancreas is an *organ* that is about 6 inches long. It's located deep in your belly between your stomach and backbone. Your *liver*, *intestine*, and other organs surround your pancreas.



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This picture shows the pancreas and nearby organs.



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This picture shows the head, body, and tail of the pancreas.

The widest part of the pancreas is called the head. The head of the pancreas is closest to the *small intestine*. The middle section is called the body, and the thinnest part is called the tail.

The pancreas makes pancreatic juices. These juices contain *enzymes* that help break down food. The juices flow through a system of ducts leading to the main *pancreatic duct*. The pancreatic juices flow through the main duct to the *duodenum*, the first part of the small intestine.

The pancreas is also a *gland* that 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.

Cancer Cells

Cancer begins in cells, the building blocks that make up *tissues*. Tissues make up the pancreas and the other organs of the body.

Normal cells grow and divide to form new cells as the body needs them. When normal cells grow old or get damaged, they die, and new cells take their place.

Sometimes, this process goes wrong. New cells form when the body doesn't need them, and old or damaged cells don't die as they should. The buildup of extra cells often forms a mass of tissue called a growth or *tumor*.

Tumors in the pancreas can be *benign* (not cancer) or *malignant* (cancer). Benign tumors are not as harmful as malignant tumors:

- **Benign tumors** (such as *cysts*):
 - are usually not a threat to life
 - can be removed and usually don't grow back
 - don't invade the tissues around them
 - don't spread to other parts of the body
- **Malignant growths**:
 - may be a threat to life
 - sometimes can be removed but can grow back
 - can invade and damage nearby tissues and organs
 - can spread to other parts of the body

Pancreatic cancer can invade other tissues, shed cancer cells into the abdomen, or spread to other organs:

- **Invasive:** A malignant pancreatic tumor can grow and invade organs next to the pancreas, such as the stomach or small intestine.
- **Shed:** Cancer cells can shed (break off) from the main pancreatic tumor. Shedding into the abdomen may lead to new tumors forming on the surface of nearby organs and tissues. The doctor may call these seeds or implants. The seeds can cause an abnormal buildup of fluid in the abdomen (*ascites*).
- **Spread:** Cancer cells can spread by breaking away from the original tumor. They can spread through the *blood vessels* to the liver and lungs. In addition, pancreatic cancer cells can spread through *lymph vessels* to nearby *lymph nodes*. After spreading, the cancer cells may attach to other tissues and grow to form new tumors that may damage those tissues.

See the Staging section on page 12 for information about cancer of the pancreas that has spread.

Risk Factors

When you get a diagnosis of cancer, it's natural to wonder what may have caused the disease. Doctors can't always explain why one person gets pancreatic cancer and another doesn't. However, we do know that people with certain *risk factors* may be more likely than others to develop cancer of the pancreas. A risk factor is something that may increase the chance of getting a disease.

Studies have found the following risk factors for cancer of the pancreas:

- **Smoking:** Smoking tobacco is the most important risk factor for pancreatic cancer. People who smoke tobacco are more likely than nonsmokers to develop this disease. Heavy smokers are most at risk.
- **Diabetes:** People with diabetes are more likely than other people to develop pancreatic cancer.
- **Family history:** Having a mother, father, sister, or brother with pancreatic cancer increases the risk of developing the disease.
- **Inflammation of the pancreas:** *Pancreatitis* is a painful inflammation of the pancreas. Having pancreatitis for a long time may increase the risk of pancreatic cancer.
- **Obesity:** People who are overweight or obese are slightly more likely than other people to develop pancreatic cancer.

Many other possible risk factors are under active study. For example, researchers are studying whether a diet high in fat (especially animal fat) or heavy drinking of alcoholic beverages may increase the risk of pancreatic cancer. Another area of active research is whether certain *genes* increase the risk of disease.

Many people who get pancreatic cancer have none of these risk factors, and many people who have known risk factors don't develop the disease.

Symptoms

Early cancer of the pancreas often doesn't cause symptoms. When the cancer grows larger, you may notice one or more of these common symptoms:

- Dark urine, pale stools, and yellow skin and eyes from *jaundice*
- Pain in the upper part of your belly
- Pain in the middle part of your back that doesn't go away when you shift your position
- Nausea and vomiting
- Stools that float in the toilet

Also, advanced cancer may cause these general symptoms:

- Weakness or feeling very tired
- Loss of appetite or feelings of fullness
- Weight loss for no known reason

These symptoms may be caused by pancreatic cancer or by other health problems. People with these symptoms should tell their doctor so that problems can be diagnosed and treated as early as possible.

Diagnosis

If you have symptoms that suggest cancer of the pancreas, your doctor will try to find out what's causing the problems.

You may have blood or other lab tests. Also, you may have one or more of the following tests:

- **Physical exam:** Your doctor feels your abdomen to check for changes in areas near the pancreas, liver, *gallbladder*, and *spleen*. Your doctor also checks for an abnormal buildup of fluid in the abdomen. Also, your skin and eyes may be checked for signs of jaundice.
- **CT scan:** An *x-ray* machine linked to a computer takes a series of detailed pictures of your pancreas, nearby organs, and blood vessels in your abdomen. You may receive an injection of *contrast material* so your pancreas shows up clearly in the pictures. Also, you may be asked to drink water so your stomach and duodenum show up better. On the CT scan, your doctor may see a tumor in the pancreas or elsewhere in the abdomen.
- **Ultrasound:** Your doctor places the ultrasound device on your abdomen and slowly moves it around. The ultrasound device uses sound waves that can't be heard by humans. The sound waves make a pattern of echoes as they bounce off internal organs. The echoes create a picture of your pancreas and other organs in the abdomen. The picture may show a tumor or blocked ducts.

- **EUS:** Your doctor passes a thin, lighted tube (*endoscope*) down your throat, through your stomach, and into the first part of the small intestine. An ultrasound probe at the end of the tube sends out sound waves that you can't hear. The waves bounce off tissues in your pancreas and other organs. As your doctor slowly withdraws the probe from the intestine toward the stomach, the computer creates a picture of the pancreas from the echoes. The picture can show a tumor in the pancreas. It can also show how deeply the cancer has invaded the blood vessels.

Some doctors use the following tests also:

- **ERCP:** The doctor passes an endoscope through your mouth and stomach, down into the first part of your small intestine. Your doctor slips a smaller tube through the endoscope into the bile ducts and pancreatic ducts. (See picture of ducts on page 4.) After injecting dye through the smaller tube 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.
- **MRI:** A large machine with a strong magnet linked to a computer is used to make detailed pictures of areas inside your body.
- **PET scan:** You'll receive an injection of a small amount of *radioactive* sugar. The radioactive sugar gives off signals that the PET scanner picks up. The PET scanner makes a picture of the places in your body where the sugar is being taken up. Cancer cells show up brighter in the picture because they take up sugar faster than normal cells do. A PET scan may show a tumor in the pancreas. It can also show cancer that has spread to other parts of the body.

- **Needle biopsy:** The doctor uses a thin needle to remove a small sample of tissue from the pancreas. EUS or CT may be used to guide the needle. A *pathologist* uses a microscope to look for cancer cells in the tissue.

You may want to ask the doctor these questions before having a biopsy:

- Do you recommend that I have a biopsy? If so, why?
- How long will it take? Will I be awake? Will it hurt?
- Is there a risk that a needle biopsy procedure will cause the cancer to spread? What are the chances of infection or bleeding after the biopsy? Are there any other risks?
- How soon will I know the results? How do I get a copy of the pathology report?
- If I do have cancer, who will talk with me about treatment? When?



Staging

If cancer of the pancreas is diagnosed, your doctor needs to learn the extent (stage) of the disease to help you choose the best treatment.

Staging is a careful attempt to find out the following:

- The size of the tumor in the pancreas
- Whether the tumor has invaded nearby tissues
- Whether the cancer has spread, and if so, to what parts of the body

When cancer of the pancreas spreads, the cancer cells may be found in nearby lymph nodes or the liver. Cancer cells may also be found in the lungs or in fluid collected from 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 original (primary) tumor. For example, if pancreatic cancer spreads to the liver, the cancer cells in the liver are actually pancreatic cancer cells. The disease is *metastatic* pancreatic cancer, not liver cancer. It's treated as pancreatic cancer, not as liver cancer. Doctors sometimes call the new tumor in the liver "distant" disease.

To learn whether pancreatic cancer has spread, your doctor may order CT scans or EUS.

Also, a *surgeon* may look inside your abdomen with a *laparoscope* (a thin, tube-like device that has a light and a lens for seeing inside the body). The surgeon inserts the laparoscope through a small *incision* in your belly button. The surgeon will look for any signs of cancer inside your abdomen. You'll need *general anesthesia* for this exam.

These are the stages of cancer of the pancreas:

- **Stage I:** The tumor is found only in the pancreas.
- **Stage II:** The tumor has invaded nearby tissue but not nearby blood vessels. The cancer may have spread to the lymph nodes.
- **Stage III:** The tumor has invaded nearby blood vessels.
- **Stage IV:** The cancer has spread to a distant organ, such as the liver or lungs.

Treatment

Treatment options for people with cancer of the pancreas are *surgery*, *chemotherapy*, *targeted therapy*, and *radiation therapy*. You'll probably receive more than one type of treatment.

The treatment that's right for you depends mainly on the following:

- The location of the tumor in your pancreas
- Whether the disease has spread
- Your age and general health

At this time, cancer of the pancreas can be cured only when it's found at an early stage (before it has spread) and only if surgery can completely remove the tumor. For people who can't have surgery, other treatments may be able to help them live longer and feel better.

You may want to talk with your doctor about taking part in a *clinical trial*. Clinical trials are research studies testing new treatments. They are an important option for people with all stages of cancer of the pancreas. See the Taking Part in Cancer Research section on page 28.

You may have a team of specialists to help plan your treatment. Your doctor may refer you to a specialist, or you may ask for a referral. Specialists who treat cancer of the pancreas include surgeons, *medical oncologists*, *radiation oncologists*, and *gastroenterologists*. Your health care team may also include an *oncology nurse*.

For help relieving or reducing pain, you may work with a specially trained doctor, a nurse, a *palliative care* team, or another pain control specialist. See the Supportive Care section on page 23.

For help reducing eating problems and maintaining your weight, you may work with a *registered dietitian*. See the Nutrition section on page 25.

Your health care team can describe your treatment choices, the expected results of each, and the possible *side effects*. Because cancer treatments often damage healthy cells and tissues, side effects are common. These side effects depend on many factors, including the type and extent of treatment. Side effects may not be the same for each person, and they may even change from one treatment session to the next. Before treatment starts, ask your health care team about possible side effects and how treatment may change your normal activities. You and your health care team can work together to develop a treatment plan that meets your needs.

You may want to ask your doctor these questions before you begin treatment:

- What is the stage of the disease? Has the cancer spread?
- Do I need any more tests to find out whether I can have surgery?
- What is the goal of treatment? What are my treatment choices? Which do you suggest for me? Why?
- What are the expected benefits of each kind of treatment?
- What can I do to prepare for treatment?
- Will I need to stay in the hospital? If so, for how long?
- What are the risks and possible side effects of each treatment? How can side effects be managed?
- How will you treat my pain?
- What is the treatment likely to cost? Will my insurance cover it?
- How will treatment affect my normal activities? Am I likely to have eating problems or other problems?
- Would a research study (clinical trial) be a good choice for me?
- Can you recommend other doctors who could give me a second opinion about my treatment options?
- How often should I have checkups?

Surgery

Surgery may be an option for people with an early stage of pancreatic cancer. The surgeon usually removes only the part of the pancreas that has cancer. But, in some cases, the whole pancreas may be removed.

The type of surgery depends on the location of the tumor in the pancreas. Surgery to remove a tumor in the head of the pancreas is called a *Whipple procedure*. The Whipple procedure is the most common type of surgery for pancreatic cancer. You and your surgeon may talk about the types of surgery and which may be right for you.

In addition to part or all of your pancreas, the surgeon usually removes the following nearby tissues:

- Duodenum
- Gallbladder
- *Common bile duct*
- Part of your stomach

Also, the surgeon may remove your spleen and nearby lymph nodes.

Surgery for pancreatic cancer is a major operation. You will need to stay in the hospital for one to two weeks afterward. Your health care team will watch for signs of bleeding, infection, or other problems.

It takes time to heal after surgery, and the time needed to recover is different for each person. You may have pain or discomfort for the first few days. Medicine can help control your pain. Before surgery, you should discuss the plan for pain relief with your health care team. After surgery, they can adjust the plan if you need more pain control. See the Supportive Care section on page 23.

It's common to feel weak or tired for a while. You may need to rest at home for one to three months after leaving the hospital.

After surgery, it may be hard to digest food. For four to six weeks after Whipple surgery, you may feel bloated or full, and you may have nausea and vomiting. A dietitian can help you change your diet to reduce your discomfort. Problems with eating usually go away within three months. See the Nutrition section on page 25.

You may want to ask your doctor these questions before having surgery:

- What type of surgery do you recommend for me? Why?
- Will tissues other than the tumor in the pancreas be removed? Why?
- How many times have you performed this surgery? How many pancreatic cancer patients do you treat each year?
- How will I feel after surgery?
- Am I likely to have eating problems? Will I need a special diet? Who can help me if I have a problem?
- If I have pain, how will you control it?
- How long will I be in the hospital?
- Will I have any long-term effects because of the surgery?

Chemotherapy

Chemotherapy uses drugs to kill cancer cells. Most people with pancreatic cancer get chemotherapy. For early pancreatic cancer, chemotherapy is usually given after surgery, but in some cases, it's given before surgery. For advanced cancer, chemotherapy is used alone, with targeted therapy, or with radiation therapy.

Chemotherapy for pancreatic cancer is usually given by vein (*intravenous*). The drugs enter the bloodstream and travel throughout your body.

Chemotherapy may be given in an outpatient part of the hospital, at the doctor's office, or at home. Rarely, you may need to stay in the hospital.

The side effects depend mainly on which drugs are given and how much. Chemotherapy kills fast-growing cancer cells, but the drugs can also harm normal cells that divide rapidly:

- **Blood cells:** When drugs lower the levels of healthy blood cells, you're more likely to get infections, bruise or bleed easily, and feel very weak and tired. Your health care team will check for low levels of blood cells. If your levels are low, your health care team may stop the chemotherapy for a while or reduce the dose of the drug. There are also medicines that can help your body make new blood cells.
- **Cells in hair roots:** Chemotherapy may cause hair loss. If you lose your hair, it will grow back after treatment, but the color and texture may be changed.
- **Cells that line the digestive tract:** Chemotherapy can cause a poor appetite, nausea and vomiting, diarrhea, or mouth and lip sores. Your health care team can give you medicines and suggest other ways to help with these problems. They usually go away when treatment ends.

Some drugs used for pancreatic cancer also may cause tingling or numbness in your hands and feet. Your health care team can suggest ways to control many of these side effects.

You may wish to read the NCI booklet *Chemotherapy and You*.

Targeted Therapy

People with cancer of the pancreas who can't have surgery may receive a type of drug called targeted therapy along with chemotherapy.

Targeted therapy slows the growth of pancreatic cancer. It also helps prevent cancer cells from spreading. The drug is taken by mouth.

Side effects may include diarrhea, nausea, vomiting, a rash, and shortness of breath. You may want to read the NCI fact sheet *Targeted Cancer Therapies*.

You may want to ask your doctor these questions about chemotherapy or targeted therapy:

- Why do I need this treatment?
- Which drug or drugs will I have?
- How do the drugs work?
- When will treatment start? When will it end?
- Will I have any long-term side effects?

Radiation Therapy

Radiation therapy uses high-energy rays to kill cancer cells. It can be given along with other treatments, including chemotherapy.

The radiation comes from a large machine. The machine aims beams of radiation at the cancer in the abdomen. You'll go to a hospital or clinic 5 days a week for several weeks to receive radiation therapy. Each session takes about 30 minutes.

Although radiation therapy is painless, it may cause other side effects. The side effects include nausea, vomiting, or diarrhea. You may also feel very tired. Your health care team can suggest ways to treat or control these side effects.

You may find it helpful to read the NCI booklet *Radiation Therapy and You*.

You may want to ask your doctor these questions about radiation therapy:

- Why do I need this treatment?
- When will the treatments begin? When will they end?
- How will I feel during treatment?
- How will we know if the radiation treatment is working?
- Will I have any long-term side effects?

Second Opinion

Before starting treatment, you may want a second opinion about your diagnosis, the stage of cancer, and the treatment plan. You may also want to find a medical center that has a lot of experience treating people with pancreatic cancer.

Some people worry that the doctor will be offended if they ask for a second opinion. Usually the opposite is true. Most doctors welcome a second opinion. And many health insurance companies will pay for a second opinion if you or your doctor requests it. Some companies require a second opinion.

If you get a second opinion, the second doctor may agree with your first doctor's diagnosis and treatment plan. Or, the second doctor may suggest another approach. Either way, you have more information and perhaps a greater sense of control. You can feel more confident about the decisions you make, knowing that you've looked at all of your options.

It may take some time and effort to gather your medical records and see another doctor. In most cases, it's not a problem to take several weeks to get a second opinion. The delay in starting treatment usually will not make treatment less effective. To make sure, you should discuss this delay with your doctor.

There are many ways to find a doctor for a second opinion. Ask your doctor, a local or state medical society, or a nearby hospital or medical school for names of specialists.

Also, you can request a consultation with specialists at the National Institutes of Health Clinical Center in Bethesda, Maryland. Specialists in NCI's Surgery Branch provide consultations and surgical care for people with pancreatic cancer. The telephone number is **301-496-4164**. The Web site is located at **<http://go.cancer.gov/surgery>**.

In addition, you can get information about treatment centers near you from NCI's Cancer Information Service at **1-800-4-CANCER (1-800-422-6237)** or **LiveHelp (<http://www.cancer.gov/livehelp>)**.

Other sources can be found in the NCI fact sheet *How To Find a Doctor or Treatment Facility If You Have Cancer*.

Supportive Care

Cancer of the pancreas and its treatment can lead to other health problems. You can have supportive care before, during, and after cancer treatment.

Supportive care is treatment to control pain and other symptoms, to relieve the side effects of therapy, and to help you cope with the feelings that a diagnosis of cancer can bring. You may receive supportive care to prevent or control these problems and to improve your comfort and quality of life during treatment.

You can get information about supportive care on NCI's Web site at **<http://www.cancer.gov/cancerinfo/coping>** and from NCI's Cancer Information Service at **1-800-4-CANCER (1-800-422-6237)** or **LiveHelp (<http://www.cancer.gov/livehelp>)**.

Pain Control

Cancer of the pancreas and its treatment may lead to pain. Your doctor or a specialist in pain control can suggest ways to relieve or reduce pain. You may want to ask if your hospital has a palliative care team.

There are many ways to relieve or reduce pain:

- **Pain medicine:** Your health care team can suggest medicines that will relieve pain. If you have constipation or other side effects from the medicine, your health care team will help you manage the problems.
- **Nerve block:** The doctor may inject alcohol into the area around certain nerves in the abdomen to block the pain.
- **Other methods:** You may find that massage or *acupuncture* helps relieve pain. Also, you may learn other methods, such as *hypnosis*, relaxation, music therapy, *imagery*, and *biofeedback*.

More information about pain control can be found in the NCI booklet *Pain Control*.

Blockage

If the tumor in the pancreas grows large enough to squeeze the common bile duct or block the duodenum, your health care team can suggest ways to help:

- **Surgery:** The surgeon can create a *bypass* through the blocked bile duct or duodenum. A bypass allows fluids to flow through the digestive tract. It can help relieve jaundice and pain resulting from the blockage.
- **Stent:** 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.

Sadness and Other Feelings

It's normal to feel sad, anxious, or confused after a diagnosis of a serious illness. Some people find it helpful to talk about their feelings. See the Sources of Support section on page 27.

Nutrition

Nutrition is an important part of your care. Getting the right nutrition can help you feel better and have more strength. However, pancreatic cancer and its treatment may make it hard for you to digest food and to maintain your weight. You may not feel like eating for a variety of reasons, such as feeling tired or feeling full soon after eating.



You may find it helpful to work with a dietitian. A dietitian can help you choose foods and nutrition products that will meet your needs and can make you feel more comfortable with eating. Your health care team will check you for weight loss and ask whether you are having problems with nausea, vomiting, or diarrhea. If your nutrition problems do not get better quickly enough, you may be offered another way of getting nutrition, such as a feeding tube.

For general information about nutrition during cancer treatment, you may want to read the NCI booklet *Eating Hints*. It contains useful ideas and recipes.

Nutrition after Surgery

After surgery, your health care team will check you for problems with digestion or with your blood sugar level, and they will help you manage such changes. If you have problems with digestion, you may need to take a supplement to replace the digestive enzymes that are normally made by the pancreas. You may also need to take minerals and vitamins. If you have problems with the sugar level in your blood, you may need to take medicine to control blood sugar.

Follow-up Care

You'll need regular checkups (such as every 3 months) after treatment for cancer of the pancreas. Checkups help ensure that any changes in your health are noted and treated if needed. If you have any health problems between checkups, you should contact your doctor.

Cancer of the pancreas may come back after treatment. Your doctor will check for return of cancer. Checkups may include a physical exam, blood tests, or CT scans.

NCI has publications to help answer questions about follow-up care and other concerns. You may find it helpful to read the NCI booklet *Facing Forward: Life After Cancer Treatment*. You may also want to read the NCI fact sheet *Follow-up Care After Cancer Treatment*.

Sources of Support

Learning that you have cancer of the pancreas can change your life and the lives of those close to you. These changes can be hard to handle. It's normal for you, your family, and your friends to need help coping with the feelings that a diagnosis of cancer can bring.

Concerns about treatments and managing side effects, hospital stays, and medical bills are common. You may also worry about caring for your family, keeping your job, or continuing daily activities.

Here's where you can go for support:

- Doctors, nurses, and other members of your health care team can answer questions about treatment, working, or other activities.
- Social workers, counselors, or members of the clergy can be helpful if you want to talk about your feelings or concerns. Often, social workers can suggest resources for financial aid, transportation, home care, or emotional support.
- Support groups also can help. In these groups, patients or their family members meet with other patients or their families to share what they have learned about coping with the disease and the effects of treatment. Groups may offer support in person, over the telephone, or on the Internet. You may want to talk with a member of your health care team about finding a support group.

- NCI's Cancer Information Service at **1-800-4-CANCER (1-800-422-6237)** and at **LiveHelp (<http://www.cancer.gov/livehelp>)** can help you locate programs, services, and NCI publications. They can send you a list of organizations that offer services to people with cancer.

For tips on coping, you may want to read the NCI booklet *Taking Time: Support for People With Cancer*.

Taking Part in Cancer Research

Doctors all over the world are conducting many types of clinical trials (research studies in which people volunteer to take part). Clinical trials are designed to find out whether new treatments are safe and effective.



Doctors are studying new drugs, other treatments, and their combinations, including combinations of surgery, chemotherapy, targeted therapy, and radiation therapy.

Even if the people in a trial do not benefit directly, they may still make an important contribution by helping doctors learn more about cancer of the pancreas and how to control it. Although clinical trials may pose some risks, doctors do all they can to protect their patients.

If you're interested in being part of a clinical trial, talk with your doctor. You may want to read the NCI booklet *Taking Part in Cancer Treatment Research Studies*. It describes how treatment studies are carried out and explains their possible benefits and risks.

NCI's Web site includes a section on clinical trials at **<http://www.cancer.gov/clinicaltrials>**. It has general information about clinical trials as well as detailed information about specific ongoing studies of cancer of the pancreas. NCI's Cancer Information Service at **1-800-4-CANCER (1-800-422-6237)** and at **LiveHelp** at **<http://www.cancer.gov/livehelp>** can answer questions and provide information about clinical trials.

Also, you may wish to contact NCI's Surgery Branch at the National Institutes of Health Clinical Center in Bethesda, Maryland. The telephone number is **301-496-4164**. The Web site is located at **<http://go.cancer.gov/surgery>**.

Dictionary

Definitions of thousands of terms are on NCI's Web site in NCI's Dictionary of Cancer Terms. You can access it at <http://www.cancer.gov/dictionary>.

Acupuncture (AK-yoo-PUNK-cher): The technique of inserting thin needles through the skin at specific points on the body to control pain and other symptoms. It is a type of complementary and alternative medicine.

Ascites (uh-SY-teez): Abnormal buildup of fluid in the abdomen that may cause swelling. In late-stage cancer, tumor cells may be found in the fluid in the abdomen. Ascites also occurs in patients with liver disease.

Benign (beh-NINE): Not cancerous. Benign tumors may grow larger but do not spread to other parts of the body. Also called nonmalignant.

Biofeedback: A method of learning to voluntarily control certain body functions such as heartbeat, blood pressure, and muscle tension with the help of a special machine. This method can help control pain.

Blood vessel: A tube through which the blood circulates in the body. Blood vessels include a network of arteries, arterioles, capillaries, venules, and veins.

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

Cancer (KAN-ser): A term for diseases in which abnormal cells divide without control and can invade nearby tissues. Cancer cells can also spread to other parts of the body through the blood and lymph systems.

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

Chemotherapy (KEE-moh-THAYR-uh-pee): Treatment with drugs that kill cancer cells.

Clinical trial (KLIH-nih-kul TRY-ul): A type of research study that tests how well new medical approaches work in people. These studies test new methods of screening, prevention, diagnosis, or treatment of a disease. Also called clinical study.

Common bile duct: A tube or vessel in the body that carries bile from the liver and gallbladder into the duodenum (the upper part of the small intestine).

Contrast material: A dye or other substance that helps show abnormal areas inside the body. It is given by injection into a vein, by enema, or by mouth. Contrast material may be used with x-rays, CT scans, MRI, or other imaging tests.

CT 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 CAT scan, computed tomography scan, computerized axial tomography scan, and computerized tomography.

Cyst (sist): A sac or capsule in the body. It may be filled with fluid or other material.

Diabetes (dy-uh-BEE-teez): Any of several diseases in which the kidneys make a large amount of urine. Diabetes usually refers to diabetes mellitus in which there is also a high level of glucose (a type of sugar) in the blood because the body does not make enough insulin or use it the way it should.

Duct (dukt): In medicine, a tube or vessel of the body through which fluids pass.

Duodenum (doo-ah-DEE-num): The first part of the small intestine that connects to the stomach.

Endocrine (EN-doh-krin): Refers to tissue that makes and releases hormones that travel in the bloodstream and control the actions of other cells or organs. Some examples of endocrine tissues are the pancreas, pituitary, thyroid, and adrenal glands.

Endoscope (EN-doh-SKOPE): A thin, tube-like instrument used to look at tissues inside the body. An endoscope has a light and a lens for viewing and may have a tool to remove tissue.

Enzyme (EN-zime): A protein that speeds up chemical reactions in the body.

ERCP: A procedure that uses an endoscope to examine and x-ray the pancreatic duct, hepatic duct, common bile duct, duodenal papilla, and gallbladder. An endoscope is a thin, tube-like instrument with a light and a lens for viewing. The 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. Also called endoscopic retrograde cholangiopancreatography.

EUS: A procedure in which an endoscope is inserted into the body. An endoscope is a thin, tube-like instrument that has a light and a lens for viewing. A probe at the end of the endoscope is used to bounce high-energy sound waves (ultrasound) off internal organs to make a picture (sonogram). Also called endoscopic ultrasound and endosonography.

Exocrine (EK-soh-krin): Refers to tissue that makes and releases substances into a duct (tube). Some ducts lead to other organs but most lead out of the body. Some examples of exocrine tissues are the tear glands, sweat glands, and the pancreas.

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

Gastroenterologist (GAS-troh-EN-teh-RAH-loh-jist): A doctor who specializes in diagnosing and treating disorders of the digestive system.

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

General anesthesia (JEN-rul A-nes-THEE-zhuh): A temporary loss of feeling and a complete loss of awareness that feels like a very deep sleep. It is caused by special drugs or other substances called anesthetics. General anesthesia keeps patients from feeling pain during surgery or other procedures.

Gland: An organ that makes one or more substances, such as hormones, digestive juices, sweat, tears, saliva, or milk. Endocrine glands release the substances directly into the bloodstream. Exocrine glands release the substances into a duct or opening to the inside or outside of the body.

Hormone (HOR-mone): One of many chemicals made by glands in the body. Hormones circulate in the bloodstream and control the actions of certain cells or organs. Some hormones can also be made in the laboratory.

Hypnosis: A trance-like state in which a person becomes more aware and focused and is more open to suggestion.

Imagery (IH-mij-ree): Technique in which people focus on positive images in their mind.

Incision (in-SIH-zhun): A cut made in the body to perform surgery.

Inflammation (IN-fluh-MAY-shun): Redness, swelling, pain, and/or a feeling of heat in an area of the body. This is a protective reaction to injury, disease, or irritation of the tissues.

Insulin (IN-suh-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-TESS-tin): The long, tube-shaped organ in the abdomen that completes the process of digestion. The intestine has two parts, the small intestine and the large intestine. Also called bowel.

Intravenous (IN-truh-VEE-nus): Into or within a vein. Intravenous usually refers to a way of giving a drug or other substance through a needle or tube inserted into a vein. Also called IV.

Islet cell (I-let sel): A pancreatic cell that produces hormones (such as insulin and glucagon) that are secreted into the bloodstream. These hormones help control the level of glucose (sugar) in the blood. Also called endocrine pancreas cell and islet of Langerhans cell.

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.

Laparoscope (LA-puh-ruh-SKOPE): A thin, tube-like instrument used to look at tissues and organs inside the abdomen. A laparoscope has a light and a lens for viewing and may have a tool to remove tissue.

Liver (LIH-ver): A large organ located in the upper abdomen. The liver cleanses the blood and aids in digestion by secreting bile.

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

Lymph vessel (limf): A thin tube that carries lymph (lymphatic fluid) and white blood cells through the lymphatic system. Also called lymphatic vessel.

Malignant (muh-LIG-nunt): Cancerous. Malignant tumors can invade and destroy nearby tissue and spread to other parts of the body.

Medical oncologist (MEH-dih-kul on-KAH-loh-jist): A doctor who specializes in diagnosing and treating cancer using chemotherapy, hormonal therapy, biological therapy, and targeted therapy. A medical oncologist often is the main health care provider for someone who has cancer. A medical oncologist also gives supportive care and may coordinate treatment given by other specialists.

Metastatic (meh-tuh-STA-tik): Having to do with metastasis, which is the spread of cancer from the primary site (place where it started) to other places in the body.

MRI: A procedure in which radio waves and a powerful magnet linked to a computer are used to create detailed pictures of areas inside the body. These pictures can show the difference between normal and diseased tissue. MRI makes better images of organs and soft tissue than other scanning techniques, such as computed tomography (CT) or x-ray. MRI is especially useful for imaging the brain, the spine, the soft tissue of joints, and the inside of bones. Also called magnetic resonance imaging, NMRI, and nuclear magnetic resonance imaging.

Needle biopsy (NEE-dul BY-op-see): The removal of tissue or fluid with a needle for examination under a microscope. When a wide needle is used, the procedure is called a core biopsy. When a thin needle is used, the procedure is called a fine-needle aspiration biopsy.

Obesity (oh-BEE-sih-tee): A condition marked by an abnormally high, unhealthy amount of body fat.

Oncology nurse (on-KAH-loh-jee): A nurse who specializes in treating and caring for people who have cancer.

Organ: A part of the body that performs a specific function. For example, the heart is an organ.

Palliative care (PA-lee-uh-tiv): Care given to improve the quality of life of patients who have a serious or life-threatening disease. The goal of palliative care is to prevent or treat as early as possible the symptoms of a disease, side effects caused by treatment of a disease, and psychological, social, and spiritual problems related to a disease or its treatment. Also called comfort care, supportive care, and symptom management.

Pancreas (PAN-kree-us): 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.

Pancreatic (PAN-kree-A-tik): Having to do with the pancreas.

Pancreatic duct (PAN-kree-A-tik dukt): Part of a system of ducts in the pancreas. Pancreatic juices containing enzymes are released into these ducts and flow into the small intestine.

Pancreatic juice (PAN-kree-A-tik joos): Fluid made by the pancreas. Pancreatic juices contain proteins called enzymes that aid in digestion.

Pancreatitis (PAN-kree-A-TY-tis): Inflammation of the pancreas. Chronic pancreatitis may cause diabetes and problems with digestion. Pain is the primary symptom.

Pathologist (puh-THAH-loh-jist): A doctor who identifies diseases by studying cells and tissues under a microscope.

PET scan: A procedure in which a small amount of radioactive glucose (sugar) is injected into a vein, and a scanner is used to make detailed, computerized pictures of areas inside the body where the glucose is used. Because cancer cells often use more glucose than normal cells, the pictures can be used to find cancer cells in the body. Also called positron emission tomography scan.

Radiation oncologist (RAY-dee-AY-shun on-KAH-loh-jist): A doctor who specializes in using radiation to treat cancer.

Radiation therapy (RAY-dee-AY-shun THAYR-uh-pee): The use of high-energy radiation from x-rays, gamma rays, neutrons, protons, 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 near cancer cells (internal radiation therapy). Systemic radiation therapy uses a radioactive substance, such as a radiolabeled monoclonal antibody, that travels in the blood to tissues throughout the body. Also called irradiation and radiotherapy.

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

Registered dietitian (dy-eh-TIH-shun): A health professional with special training in the use of diet and nutrition to keep the body healthy. A registered dietitian may help the medical team improve the nutritional health of a patient.

Risk factor: Something that increases the chance of developing a disease. Some examples of risk factors for cancer are age, a family history of certain cancers, use of tobacco products, being exposed to radiation or certain chemicals, infection with certain viruses or bacteria, and certain genetic changes.

Side effect: A problem that occurs when treatment affects healthy tissues or organs. Some common side effects of cancer treatment are fatigue, pain, nausea, vomiting, decreased blood cell counts, hair loss, and mouth sores.

Small intestine (in-TESS-tin): The part of the digestive tract that is located between the stomach and the large intestine.

Spleen: An organ that is part of the lymphatic system. The spleen makes 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.

Supportive care: Care given to improve the quality of life of patients who have a serious or life-threatening disease. The goal of supportive care is to prevent or treat as early as possible the symptoms of a disease, side effects caused by treatment of a disease, and psychological, social, and spiritual problems related to a disease or its treatment. Also called comfort care, palliative care, and symptom management.

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

Surgery (SER-juh-ree): A procedure to remove or repair a part of the body or to find out whether disease is present. An operation.

Targeted therapy (TAR-geh-ted THAYR-uh-pee): A type of treatment that uses drugs or other substances, such as monoclonal antibodies, to identify and attack specific cancer cells. Targeted therapy may have fewer side effects than other types of cancer treatments.

Tissue (TISH-oo): A group or layer of cells that work together to perform a specific function.

Tumor (TOO-mer): An abnormal mass of tissue that results when cells divide more than they should or do not die when they should. Tumors may be benign (not cancer), or malignant (cancer). Also called neoplasm.

Ultrasound (UL-truh-SOWND): A procedure in which high-energy sound waves are bounced off internal tissues or organs and make echoes. The echo patterns are shown on the screen of an ultrasound machine, forming a picture of body tissues called a sonogram. Also called ultrasonography.

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.

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

National Cancer Institute Publications

NCI provides publications about cancer, including the booklets and fact sheets mentioned in this booklet. Many are available in both English and Spanish.

You may read publications online and print your own copy. Also, people in the United States and its territories may order NCI publications:

- **By telephone:** People in the United States and its territories may order these and other NCI publications by calling the NCI's Cancer Information Service at **1-800-4-CANCER (1-800-422-6237)**.
- **On the Internet:** Many NCI publications may be viewed, downloaded, and ordered from **<http://www.cancer.gov/publications>**. This Web site also explains how people outside the United States can mail or fax their requests for NCI booklets.

Cancer Treatment and Supportive Care

- *How To Find a Doctor or Treatment Facility If You Have Cancer* (also in Spanish)
- *Chemotherapy and You* (also in Spanish)
- *Targeted Cancer Therapies*
- *Radiation Therapy and You* (also in Spanish)
- *Understanding Radiation Therapy: What To Know About External Beam Radiation Therapy* (also in Spanish)
- *Pain Control* (also in Spanish)
- *Eating Hints* (also in Spanish)

Coping with Cancer

- *Taking Time: Support for People with Cancer*
- *Managing Radiation Therapy Side Effects: What To Do When You Feel Weak or Tired (Fatigue)* (also in Spanish)

Life After Cancer Treatment

- *Facing Forward: Life After Cancer Treatment* (also in Spanish)
- *Follow-up Care After Cancer Treatment*
- *Facing Forward: Ways You Can Make a Difference in Cancer*

Advanced or Recurrent Cancer

- *Coping With Advanced Cancer*
- *When Cancer Returns*

Complementary Medicine

- *Thinking about Complementary & Alternative Medicine*

Caregivers

- *When Someone You Love Is Being Treated for Cancer: Support for Caregivers*
- *When Someone You Love Has Advanced Cancer: Support for Caregivers*
- *Facing Forward: When Someone You Love Has Completed Cancer Treatment*
- *Caring for the Caregiver: Support for Cancer Caregivers*

Quitting Smoking

- *Clearing the Air: Quit Smoking Today*

Research Studies

- *Taking Part in Cancer Treatment Research Studies*
- *Providing Your Tissue for Research: What You Need To Know*
- *Donating Tissue for Cancer Research: Biospecimens and Biorepositories*

The National Cancer Institute

The National Cancer Institute (NCI), part of the National Institutes of Health, is the Federal Government's principal agency for cancer research and training. NCI conducts and supports basic and clinical research to find better ways to prevent, diagnose, and treat cancer. The Institute also supports education and training for cancer research and treatment programs. In addition, NCI is responsible for communicating its research findings to the medical community and the public.

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