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## About Pancreatic Cancer

### Overview and Types

If you have been diagnosed with pancreatic cancer or worried about it, you likely have a lot of questions. Learning some basics is a good place to start.

- [What Is Pancreatic Cancer?](#)

### Research and Statistics

See the latest estimates for new cases of pancreatic cancer and deaths in the US and what research is currently being done.

- [Key Statistics for Pancreatic Cancer](#)
  - [What's New in Pancreatic Cancer Research?](#)
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## What Is Pancreatic Cancer?

Pancreatic cancer is a type of cancer that starts in the pancreas. (Cancer starts when cells in the body begin to grow out of control. To learn more about how cancers start and spread, see [What Is Cancer?](#)<sup>1</sup>)

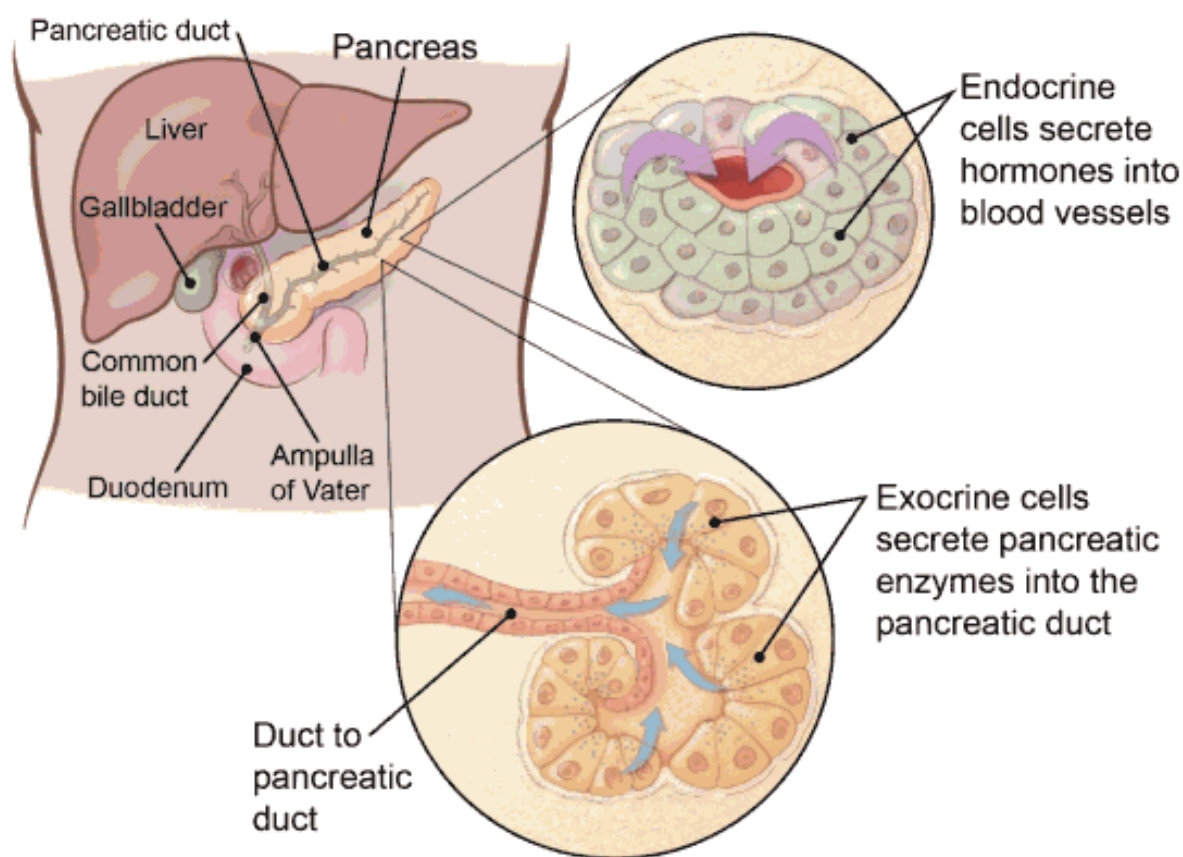
Pancreatic adenocarcinoma is the most common type of pancreatic cancer. Pancreatic neuroendocrine tumors (NETs) are a less common type and are discussed in [Pancreatic Neuroendocrine Tumors](#)<sup>2</sup>.

## Where pancreatic cancer starts

### The pancreas

The pancreas is an organ that sits behind the stomach. It's shaped a bit like a fish with a wide head, a tapering body, and a narrow, pointed tail. In adults it's about 6 inches (15 centimeters) long but less than 2 inches (5 centimeters) wide.

- The head of the pancreas is on the right side of the abdomen (belly), behind where the stomach meets the duodenum (the first part of the small intestine).
- The body of the pancreas is behind the stomach.
- The tail of the pancreas is on the left side of the abdomen next to the spleen.



The most common type of pancreatic cancer, adenocarcinoma of the pancreas, starts when **exocrine cells** in the pancreas start to grow out of control. Most of the pancreas is made up of exocrine cells which form the exocrine glands and ducts. The exocrine glands make pancreatic enzymes that are released into the intestines to help you digest foods (especially fats). The enzymes are released into tiny tubes called ducts which

eventually empty into the pancreatic duct. The pancreatic duct merges with the common bile duct (the duct that carries bile from the liver), and empties into the duodenum (the first part of the small intestine) at the ampulla of Vater.

**Endocrine cells** make up a smaller percentage of the cells in the pancreas. These cells make important hormones like insulin and glucagon (which help control blood sugar levels), and release them directly into the blood. Pancreatic neuroendocrine tumors start in the endocrine cells. See [Pancreatic Neuroendocrine Tumor<sup>3</sup>](#) for more about this type.

**If you are diagnosed with pancreatic cancer, it's very important to know if it's an endocrine cancer (see [Pancreatic Neuroendocrine Tumor<sup>4</sup>](#)) or exocrine cancer (discussed here). They have distinct risk factors and causes, have different signs and symptoms, are diagnosed with different tests, are treated in different ways, and have different outlooks.**

## Types of pancreatic cancer

Exocrine cancers are by far the most common type of pancreas cancer. If you are told you have pancreatic cancer, it's most likely an exocrine pancreatic cancer.

**Pancreatic adenocarcinoma:** About 95% of cancers of the exocrine pancreas are adenocarcinomas. These cancers usually start in the ducts of the pancreas. Less often, they develop from the cells that make the pancreatic enzymes, in which case they are called *acinar cell carcinomas*.

**Less common types of exocrine cancer:** Other, less common exocrine cancers include adenosquamous carcinomas, squamous cell carcinomas, signet ring cell carcinomas, undifferentiated carcinomas, and undifferentiated carcinomas with giant cells.

**Ampullary cancer (carcinoma of the ampulla of Vater):** This cancer starts in the ampulla of Vater, which is where the bile duct and pancreatic duct come together and empty into the small intestine. Ampullary cancers aren't technically pancreatic cancers, but they are included here because they are treated much the same.

Ampullary cancers often block the bile duct while they're still small and have not spread far. This blockage causes bile to build up in the body, which leads to yellowing of the skin and eyes (jaundice). Because of this, these cancers are usually found earlier than most pancreatic cancers, and they usually have a better prognosis (outlook).

## Benign and precancerous growths in the pancreas

Some growths in the pancreas are simply benign (not cancer), while others might become cancer over time if left untreated (known as *precancers*). Because people are getting imaging tests such as [CT scans](#)<sup>5</sup> more often than in the past (for a number of reasons), these types of pancreatic growths are now being found more often.

**Serous cystic neoplasms (SCNs)** (also known as *serous cystadenomas*) are tumors that have sacs (cysts) filled with fluid. SCNs are almost always benign, and most don't need to be treated unless they grow large or cause symptoms.

**Mucinous cystic neoplasms (MCNs)** (also known as *mucinous cystadenomas*) are slow-growing tumors that have cysts filled with a jelly-like substance called *mucin*. These tumors almost always occur in women. While they are not cancer, some of them can progress to cancer over time if not treated, so these tumors are typically removed with surgery.

**Intraductal papillary mucinous neoplasms (IPMNs)** are benign tumors that grow in the pancreatic ducts. Like MCNs, these tumors make mucin, and over time they sometimes become cancer if not treated. Some IPMNs can just be followed closely over time, but some might need to be removed with surgery if they have certain features, such as if they are in the main pancreatic duct.

**Solid pseudopapillary neoplasms (SPNs)** are rare, slow-growing tumors that almost always develop in young women. Even though these tumors tend to grow slowly, they can sometimes spread to other parts of the body, so they are best treated with surgery. The outlook for people with these tumors is usually very good.

## Hyperlinks

1. [www.cancer.org/cancer/cancer-basics/what-is-cancer.html](http://www.cancer.org/cancer/cancer-basics/what-is-cancer.html)
2. [www.cancer.org/cancer/pancreatic-neuroendocrine-tumor.html](http://www.cancer.org/cancer/pancreatic-neuroendocrine-tumor.html)
3. [www.cancer.org/cancer/pancreatic-neuroendocrine-tumor.html](http://www.cancer.org/cancer/pancreatic-neuroendocrine-tumor.html)
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## Key Statistics for Pancreatic Cancer

### How common is pancreatic cancer?

The American Cancer Society's estimates for pancreatic cancer in the United States for 2019 are:

- About 56,770 people (29,940 men and 26,830 women) will be diagnosed with pancreatic cancer.
- About 45,750 people (23,800 men and 21,950 women) will die of pancreatic cancer.

Pancreatic cancer accounts for about 3% of all cancers in the US and about 7% of all cancer deaths.

It is slightly more common in men than in women.

### Lifetime risk of pancreatic cancer

The average lifetime risk of pancreatic cancer is about 1 in 64. But each person's chances of getting this cancer can be affected by certain [risk factors](#)<sup>1</sup>.

For statistics related to survival, see [Pancreatic Cancer Survival Rates by Stage](#)<sup>2</sup>.

Visit our [Cancer Statistics Center](#)<sup>3</sup> for more key statistics.

### Hyperlinks

1. [www.cancer.org/cancer/pancreatic-cancer/causes-risks-prevention/risk-factors.html](http://www.cancer.org/cancer/pancreatic-cancer/causes-risks-prevention/risk-factors.html)
2. [www.cancer.org/cancer/pancreatic-cancer/detection-diagnosis-staging/survival-rates.html](http://www.cancer.org/cancer/pancreatic-cancer/detection-diagnosis-staging/survival-rates.html)
3. <https://cancerstatisticscenter.cancer.org>

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# What's New in Pancreatic Cancer Research?

Research into the causes, diagnosis, and treatment of pancreatic cancer is under way in many medical centers throughout the world.

## Genetics and early detection

Scientists are learning more about some of the gene changes in pancreas cells that cause them to become cancer. [Inherited changes](#)<sup>1</sup> in genes such as *BRCA2*, *p16*, and

the genes responsible for Lynch syndrome can increase a person's risk of developing pancreatic cancer.

Researchers are now looking at how these and other genes may be altered in pancreatic cancers that are not inherited. Pancreatic cancer actually develops over many years in a series of steps known as pancreatic intraepithelial neoplasia or PanIN. In the early steps, such as PanIN 1, there are changes in a small number of genes, and the duct cells of the pancreas do not look very abnormal. In later steps such as PanIN 2 and PanIN 3, there are changes in several genes and the duct cells look more abnormal.

Researchers are using this information to develop tests for detecting acquired (not inherited) gene changes in pancreatic pre-cancerous conditions. One of the most common DNA changes in these conditions affects the *KRAS* oncogene, which affects regulation of cell growth. New diagnostic tests are often able to recognize this change in samples of pancreatic juice collected during an [ERCP<sup>2</sup>](#) (endoscopic retrograde cholangiopancreatography).

For now, imaging tests like endoscopic ultrasound (EUS), ERCP, and genetic tests for changes in certain genes (such as *KRAS*) are options for people with a strong family history of pancreatic cancer. But these tests are not recommended for widespread testing of people at average risk who do not have any [symptoms<sup>3</sup>](#).

Other tests are looking to see if groups of proteins found in the blood might be used to find pancreatic cancer early, when it is likely to be easier to treat. Some early results with this approach have been promising, but more research is needed to confirm its usefulness.

## Treatment

A lot of research is focused on finding better treatments for pancreatic cancer. Improving surgery and radiation therapy are major goals, as is determining the best combination of treatments for people with certain [stages<sup>4</sup>](#) of cancer.

### Surgery

[Surgery<sup>5</sup>](#) to remove pancreatic cancer (most often a Whipple procedure) is a long and complex operation that can be hard both for the surgeon and the patient. It often requires a long hospital stay, at least in part because of the long incision (cut) made in the belly.

A newer approach now used at some major medical centers is to do the operation laparoscopically. For this approach, the surgeon makes several small incisions in the belly instead of one large one. Long, thin surgical tools and a tiny video camera are then inserted through these cuts to do the operation. One advantage of this surgery is that people often recover from it more quickly. But this is still a difficult operation. Surgeons are looking to see how it compares to the standard operation and which patients might be helped the most by it.

## Radiation therapy

Some studies are looking at different ways to give [radiation](#)<sup>6</sup> to treat pancreatic cancer. These include intraoperative radiation therapy (in which a single large dose of radiation is given to the area of the cancer in the operating room at the time of surgery) and proton beam radiation (which uses a special type of radiation that might do less damage to nearby normal cells).

## Chemotherapy

Many clinical trials are testing new combinations of [chemotherapy](#)<sup>7</sup> drugs for pancreatic cancer. Many studies are seeing if combining gemcitabine with other drugs can help people live longer. Other newer chemo drugs are also being tested, as are combinations of chemo drugs with newer types of drugs.

## Targeted therapies

[Targeted drugs](#)<sup>8</sup> work differently from standard chemo drugs in that they attack only specific targets on cancer cells (or nearby cells). Targeted therapies may prove to be useful along with, or instead of, current treatments. In general, they seem to have different side effects than traditional chemo drugs. Looking for new targets to attack is an active area of cancer research.

**Growth factor inhibitors:** Many types of cancer cells, including pancreatic cancer cells, have certain proteins on their surface that help them grow. These proteins are called *growth factor receptors*. One example is epidermal growth factor receptor (EGFR). Several drugs that target EGFR are now being studied. One, known as erlotinib (Tarceva), is already approved for use along with gemcitabine.

**Anti-angiogenesis factors:** All cancers depend on new blood vessels to nourish their growth. To block the growth of these vessels and thereby starve the tumor, scientists have developed anti-angiogenesis drugs. These are being studied in [clinical trials](#)<sup>9</sup> for patients with pancreatic cancer.



## Immune therapy

[Immune therapies](#)<sup>10</sup> attempt to boost a person's immune system or give them ready-made components of an immune system to attack cancer cells. Some studies of these treatments have shown promising results.

**Monoclonal antibodies:** One form of immune therapy uses injections of man-made [monoclonal antibodies](#)<sup>11</sup>. These immune system proteins are made to home in on a specific molecule, such as carcinoembryonic antigen (CEA), which is sometimes found on the surface of pancreatic cancer cells. Toxins or radioactive atoms can be attached to these antibodies, which bring them directly to the tumor cells. The hope is that they will destroy cancer cells while leaving normal cells alone. For use in pancreatic cancer, these types of treatments are available only in clinical trials at this time.

**Cancer vaccines:** Several types of [vaccines](#)<sup>12</sup> for boosting the body's immune response to pancreatic cancer cells are being tested in clinical trials. Unlike vaccines against infections like measles or mumps, these vaccines are designed to help treat, not prevent, pancreatic cancer. One possible advantage of these types of treatments is that they tend to have very limited side effects. At this time, vaccines are available only in clinical trials.

**Drugs that target immune system checkpoints:** The immune system normally keeps itself from attacking other normal cells in the body by using "checkpoints" – proteins on immune cells that need to be activated (or inactivated) to start an immune response. Cancer cells sometimes find ways to use these checkpoints to avoid being attacked by the immune system. Newer drugs that target these checkpoints have shown a lot of promise in treating some types of cancer. Some of these are now being studied for use in pancreatic cancer.

## Individualization of therapy

Some drugs seem to work better if certain types of mutations can be found in the patient's tumor. For example, erlotinib may work better in patients whose tumors have a particular change in the *EGFR* gene. This concept is an area of intense study. There might also be some gene alterations that affect how well gemcitabine will work in a particular patient. Identifying markers that can predict how well a drug will work before it is given is an important area of research in many types of cancer.

## Hyperlinks

1. [www.cancer.org/cancer/cancer-causes/genetics/family-cancer-syndromes.html](http://www.cancer.org/cancer/cancer-causes/genetics/family-cancer-syndromes.html)

2. [www.cancer.org/cancer/pancreatic-cancer/detection-diagnosis-staging/how-diagnosed.html](http://www.cancer.org/cancer/pancreatic-cancer/detection-diagnosis-staging/how-diagnosed.html)
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# Pancreatic Cancer Causes, Risk Factors, and Prevention

## Risk Factors

A risk factor is anything that affects your chance of getting a disease such as cancer. Learn more about the risk factors for pancreatic cancer.

- [Pancreatic Cancer Risk Factors](#)
- [What Causes Pancreatic Cancer?](#)

## Prevention

There is no way to prevent all pancreatic cancers. But there are things you can do that might lower your risk. Learn more.

- [Can Pancreatic Cancer Be Prevented?](#)

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# Pancreatic Cancer Risk Factors

A risk factor is anything that increases your chance of getting a disease such as cancer. Different cancers have different risk factors. Some risk factors, like smoking, can be changed. Others, like a person's age or family history, can't be changed.

In some cases, there might be a factor that may decrease your risk of developing

cancer or has an unclear effect. That is not considered a risk factor, but you may see them noted clearly on this page as well.

Having a risk factor, or even many, does not mean that you will get cancer. And some people who get cancer may have few or no known risk factors.

Here are some of the risk factors known to increase your risk for pancreatic cancer.

## **Risk factors that can be changed**

### **Tobacco use**

[Smoking](#)<sup>1</sup> is one of the most important risk factors for pancreatic cancer. The risk of getting pancreatic cancer is about twice as high among smokers compared to those who have never smoked. About 25% of pancreatic cancers are thought to be caused by cigarette smoking. Cigar smoking and the use of smokeless tobacco products also increase the risk. However, the risk of pancreatic cancer starts to drop once a person stops smoking . See [Can Pancreatic Cancer Be Prevented?](#)

### **Being overweight**

[Being very overweight \(obese\)](#)<sup>2</sup> is a risk factor for pancreatic cancer. Obese people (body mass index [BMI] of 30 or more) are about 20% more likely to develop pancreatic cancer.

Carrying extra weight around the waistline may be a risk factor even in people who are not very overweight.

### **Workplace exposure to certain chemicals**

Heavy exposure at work to certain chemicals used in the dry cleaning and metal working industries may raise a person's risk of pancreatic cancer.

## **Risk factors that can't be changed**

### **Age**

The risk of developing pancreatic cancer goes up as people age. Almost all patients are older than 45. About two-thirds are at least 65 years old. The average age at the time of diagnosis is 70.

## Gender

Men are slightly more likely to develop pancreatic cancer than women. This may be due, at least in part, to higher tobacco use in men, which raises pancreatic cancer risk (see above).

## Race

African Americans are slightly more likely to develop pancreatic cancer than whites. The reasons for this aren't clear, but it may be due in part to having higher rates of some other risk factors for pancreatic cancer, such as diabetes, smoking, and being overweight.

## Family history

Pancreatic cancer seems to run in some families. In some of these families, the high risk is due to an inherited syndrome (explained below). In other families, the gene causing the increased risk is not known. Although family history is a risk factor, most people who get pancreatic cancer do not have a family history of it.

## Inherited genetic syndromes

Inherited gene changes (mutations) can be passed from parent to child. These gene changes may cause as many as 10% of pancreatic cancers. Sometimes these changes result in syndromes that include increased risks of other cancers (or other health problems). Examples of [genetic syndromes](#)<sup>3</sup> that can cause pancreatic cancer include:

- **Hereditary breast and ovarian cancer syndrome**, caused by mutations in the *BRCA1* or *BRCA2* genes
- **Hereditary breast cancer**, caused by mutations in the *PALB2* gene
- **Familial atypical multiple mole melanoma (FAMMM) syndrome**, caused by mutations in the *p16/CDKN2A* gene and associated with skin and eye melanomas
- **Familial pancreatitis**, usually caused by mutations in the *PRSS1* gene
- **Lynch syndrome**, also known as *hereditary non-polyposis colorectal cancer* (HNPCC), most often caused by a defect in the *MLH1* or *MSH2* genes
- **Peutz-Jeghers syndrome**, caused by defects in the *STK11* gene. This syndrome is also linked with polyps in the digestive tract and several other cancers.

Changes in the genes that cause some of these syndromes can be found by genetic testing. For more information on genetic testing, see [Can Pancreatic Cancer Be Found](#)

## [Early?](#)<sup>4</sup>

### **Diabetes**

Pancreatic cancer is more common in people with diabetes. The reason for this is not known. Most of the risk is found in people with type 2 diabetes. This type of diabetes most often starts in adulthood and is often related to being overweight or obese. It's not clear if people with type 1 (juvenile) diabetes have a higher risk.

### **Chronic pancreatitis**

Chronic pancreatitis, a long-term inflammation of the pancreas, is linked with an increased risk of pancreatic cancer (especially in smokers), but most people with pancreatitis never develop pancreatic cancer.

Chronic pancreatitis is sometimes due to an [inherited gene mutation](#)<sup>5</sup>. People with this inherited (familial) form of pancreatitis have a high lifetime risk of pancreatic cancer.

## **Factors with unclear effect on risk**

### **Diet**

Some studies have linked pancreatic cancer to [diets](#)<sup>6</sup> that are high in red and processed meats (such as sausage and bacon) and low in fruits and vegetables. But not all studies have found such links, and this is still being studied.

### **Physical inactivity**

Some research has suggested that [lack of physical activity](#)<sup>7</sup> might increase pancreatic cancer risk. But not all studies have found this .

### **Coffee**

Some older studies have suggested that drinking coffee might increase the risk of pancreatic cancer, but more recent studies have not confirmed this.

### **Alcohol**

Some studies have shown a link between [heavy alcohol use](#)<sup>8</sup> and pancreatic cancer. This link is still not certain, but heavy alcohol use can lead to conditions such as chronic

pancreatitis, which is known to increase pancreatic cancer risk.

## Infections

Some research suggests that infection of the stomach with the ulcer-causing bacteria *Helicobacter pylori* (*H. pylori*) or infection with Hepatitis B may increase the risk of getting pancreatic cancer. More studies are needed.

## Hyperlinks

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## What Causes Pancreatic Cancer?

We don't know what causes pancreatic cancer. But we do know many of the risk factors for this cancer (see [Pancreatic Cancer Risk Factors](#)) and how some of them cause cells to become cancerous.

Some genes control when cells grow, divide into new cells, and die:

- Genes that help cells grow, divide, and stay alive are called *oncogenes*.
- Genes that help keep cell division under control or cause cells to die at the right time are called *tumor suppressor genes*.

Cancers can be caused by DNA changes that turn on oncogenes or turn off tumor suppressor genes.

## Inherited gene mutations

Some people [inherit gene changes](#)<sup>1</sup> from their parents that raise their risk of pancreatic cancer. Sometimes these gene changes are part of syndromes that include increased risks of other health problems as well. These syndromes, which cause a small portion of all pancreatic cancers, are discussed in [Risk Factors for Pancreatic Cancer](#).

## Acquired gene mutations

Most gene mutations related to cancers of the pancreas occur after a person is born, rather than having been inherited. These *acquired* gene mutations sometimes result from exposure to cancer-causing chemicals (like those found in [tobacco smoke](#)<sup>2</sup>). But often what causes these changes is not known. Many gene changes are probably just random events that sometimes happen inside a cell, without having an outside cause.

Some of the DNA changes often seen in sporadic (non-inherited) cases of pancreatic cancer are the same as those seen in inherited cases, while others are different. For example, many sporadic cases of pancreatic cancer have changes in the *p16* and *TP53* genes, which can also be seen in some genetic syndromes. But many pancreatic cancers also have changes in genes such as *KRAS*, *BRAF*, and *DPC4 (SMAD4)*, which are not part of inherited syndromes. Other gene changes can also be found in pancreatic cancers, although often it's not clear what has caused these changes.

## Hyperlinks

1. [www.cancer.org/cancer/cancer-causes/genetics.html](http://www.cancer.org/cancer/cancer-causes/genetics.html)
2. [www.cancer.org/cancer/cancer-causes/tobacco-and-cancer/carcinogens-found-in-](http://www.cancer.org/cancer/cancer-causes/tobacco-and-cancer/carcinogens-found-in-)

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## Can Pancreatic Cancer Be Prevented?

There is no sure way to prevent pancreatic cancer. Some [risk factors](#) such as age, gender, race, and family history can't be controlled. But there are things you can do that might lower your risk.

### Don't smoke

Smoking is the most important avoidable risk factor for pancreatic cancer. [Quitting smoking](#)<sup>1</sup> helps lower risk. If you smoke and want help quitting, please talk to your

health care provider or call us at 1-800-227-2345.

## Stay at a healthy weight

Getting to and staying at a [healthy weight](#)<sup>2</sup> might also help lower your risk. While the effects of getting [physical activity](#)<sup>3</sup> and eating well on pancreatic cancer risk are not as clear, both of these can help you stay at a healthy weight.

The American Cancer Society recommends choosing foods and beverages in amounts that help you get to and stay at a healthy weight. Eat a healthy diet, with an emphasis on plant foods. This includes at least 2½ cups of vegetables and fruits every day. Choose whole-grain breads, pastas, and cereals instead of refined grains, and eat fish, poultry, or beans instead of processed meat and red meat. For more, see the [American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention](#)<sup>4</sup>.

## Limit alcohol use

Heavy alcohol use has been tied to pancreatic cancer in some studies. This link is still not certain, but heavy alcohol use can also lead to conditions such as chronic pancreatitis, which is known to increase pancreatic cancer risk.

## Limit exposure to certain chemicals in the workplace

Avoiding workplace exposure to certain [chemicals](#)<sup>5</sup> may reduce your risk for pancreatic cancer.

## Hyperlinks

1. [www.cancer.org/healthy/stay-away-from-tobacco.html](http://www.cancer.org/healthy/stay-away-from-tobacco.html)
2. [www.cancer.org/healthy/eat-healthy-get-active.html](http://www.cancer.org/healthy/eat-healthy-get-active.html)
3. [www.cancer.org/healthy/eat-healthy-get-active.html](http://www.cancer.org/healthy/eat-healthy-get-active.html)
4. [www.cancer.org/healthy/eat-healthy-get-active/acs-guidelines-nutrition-physical-activity-cancer-prevention.html](http://www.cancer.org/healthy/eat-healthy-get-active/acs-guidelines-nutrition-physical-activity-cancer-prevention.html)
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# Pancreatic Cancer Early Detection, Diagnosis, and Staging

## Detection and Diagnosis

Catching cancer early often allows for more treatment options. Some early cancers may have signs and symptoms that can be noticed, but that is not always the case.

- [Can Pancreatic Cancer Be Found Early?](#)
- [Signs and Symptoms of Pancreatic Cancer](#)
- [Tests for Pancreatic Cancer](#)

## Stages and Outlook (Prognosis)

After a cancer diagnosis, staging provides important information about the extent of cancer in the body and anticipated response to treatment.

- [Pancreatic Cancer Stages](#)
- [Survival Rates for Pancreatic Cancer](#)

## Questions to Ask About Pancreatic Cancer

Here are some questions you can ask your cancer care team to help you better understand your cancer diagnosis and treatment options.

- [Questions to Ask About Pancreatic Cancer](#)

# Can Pancreatic Cancer Be Found Early?

Pancreatic cancer is hard to find early. The pancreas is deep inside the body, so early tumors can't be seen or felt by health care providers during routine physical exams. People usually have no [symptoms](#) until the cancer has become very large or has already spread to other organs.

For certain types of cancer, screening tests or exams are used to look for cancer in people who have no symptoms (and who have not had that cancer before). But for pancreatic cancer, no major professional groups currently recommend routine screening in people who are at average risk. This is because no screening test has been shown to lower the risk of dying from this cancer.

## Genetic testing for people who might be at increased risk

Some people might be at increased risk of pancreatic cancer because of a family history of the disease (or a family history of certain other cancers). Sometimes this increased risk is due to a specific [genetic syndrome](#)<sup>1</sup>.

Genetic testing looks for the [gene changes](#)<sup>2</sup> that cause these inherited conditions and increase pancreatic cancer risk. The tests look for these inherited conditions, not pancreatic cancer itself. Your risk may be increased if you have one of these conditions, but it doesn't mean that you have (or definitely will get) pancreatic cancer.

Knowing if you are at increased risk can help you and your doctor decide if you should have tests to look for pancreatic cancer early, when it might be easier to treat. But determining whether you might be at increased risk is not simple. The American Cancer Society strongly recommends that anyone thinking about genetic testing talk with a genetic counselor, nurse, or doctor (qualified to interpret and explain the test results) *before* getting tested. It's important to understand what the tests can and can't tell you, and what any results might mean, before deciding to be tested.

## Testing for pancreatic cancer in people at high risk

For people in families at high risk of pancreatic cancer, newer tests for detecting pancreatic cancer early may help. The two most common tests used are an *endoscopic ultrasound* or *MRI*. (See [Tests for Pancreatic Cancer](#).) These tests are not used to screen the general public, but might be used for someone with a strong family history of pancreatic cancer or with a known genetic syndrome that increases their risk. Doctors have been able to find early, treatable pancreatic cancers in some members of high-risk

families with these tests.

Doctors are also studying other new tests to try to find pancreatic cancer early. (See [What's New in Pancreatic Cancer Research?](#)<sup>3</sup>) Interested families at high risk may wish to take part in studies of these new screening tests.

## Hyperlinks

1. [www.cancer.org/cancer/cancer-causes/genetics/family-cancer-syndromes.html](http://www.cancer.org/cancer/cancer-causes/genetics/family-cancer-syndromes.html)
2. [www.cancer.org/cancer/cancer-causes/genetics/genes-and-cancer.html](http://www.cancer.org/cancer/cancer-causes/genetics/genes-and-cancer.html)
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# Signs and Symptoms of Pancreatic Cancer

Early pancreatic cancers often do not cause any signs or symptoms. By the time they do cause symptoms, they have often grown very large or already spread outside the



pancreas.

Having one or more of the symptoms below does not mean you have pancreatic cancer. In fact, many of these symptoms are more likely to be caused by other conditions. Still, if you have any of these symptoms, it's important to have them checked by a doctor so that the cause can be found and treated, if needed.

### **Jaundice and related symptoms**

**Jaundice** is yellowing of the eyes and skin. Most people with pancreatic cancer (and nearly all people with ampullary cancer) will have jaundice as one of their first symptoms.

Jaundice is caused by the buildup of bilirubin, a dark yellow-brown substance made in the liver. Normally, the liver releases a liquid called *bile* that contains bilirubin. Bile goes through the common bile duct into the intestines, where it helps break down fats. It eventually leaves the body in the stool. When the common bile duct becomes blocked, bile can't reach the intestines, and the amount of bilirubin in the body builds up.

Cancers that start in the head of the pancreas are near the common bile duct. These cancers can press on the duct and cause jaundice while they are still fairly small, which can sometimes lead to these tumors being found at an early stage. But cancers that start in the body or tail of the pancreas don't press on the duct until they have spread through the pancreas. By this time, the cancer has often spread beyond the pancreas.

When pancreatic cancer spreads, it often goes to the liver. This can also cause jaundice.

There are other signs of jaundice as well as the yellowing of the eyes and skin:

- **Dark urine:** Sometimes, the first sign of jaundice is darker urine. As bilirubin levels in the blood increase, the urine becomes brown in color.
- **Light-colored or greasy stools:** Bilirubin normally helps give stools their brown color. If the bile duct is blocked, stools might be light-colored or gray. Also, if bile and pancreatic enzymes can't get through to the intestines to help break down fats, the stools can become greasy and might float in the toilet.
- **Itchy skin:** When bilirubin builds up in the skin, it can start to itch as well as turn yellow.

Pancreatic cancer is not the most common cause of jaundice. Other causes, such as

gallstones, hepatitis, and other liver and bile duct diseases, are much more common.

### **Belly or back pain**

Pain in the abdomen (belly) or back is common in pancreatic cancer. Cancers that start in the body or tail of the pancreas can grow fairly large and start to press on other nearby organs, causing pain. The cancer may also spread to the nerves surrounding the pancreas, which often causes back pain. Pain in the abdomen or back is fairly common and is most often caused by something other than pancreatic cancer.

### **Weight loss and poor appetite**

Unintended weight loss is very common in people with pancreatic cancer. These people often have little or no appetite.

### **Nausea and vomiting**

If the cancer presses on the far end of the stomach it can partly block it, making it hard for food to get through. This can cause nausea, vomiting, and pain that tend to be worse after eating.

### **Gallbladder or liver enlargement**

If the cancer blocks the bile duct, bile can build up in the gallbladder, making it larger. Sometimes a doctor can feel this (as a large lump under the right side of the ribcage) during a physical exam. It can also be seen on [imaging tests](#).

Pancreatic cancer can also sometimes enlarge the liver, especially if the cancer has spread there. The doctor might be able to feel the edge of the liver below the right ribcage on an exam, or the large liver might be seen on imaging tests.

### **Blood clots**

Sometimes, the first clue that someone has pancreatic cancer is a blood clot in a large vein, often in the leg. This is called a *deep vein thrombosis* or DVT. Symptoms can include pain, swelling, redness, and warmth in the affected leg. Sometimes a piece of the clot can break off and travel to the lungs, which might make it hard to breathe or cause chest pain. A blood clot in the lungs is called a *pulmonary embolism* or PE.

Still, having a blood clot does not usually mean that you have cancer. Most blood clots are caused by other things.

## Diabetes

Rarely, pancreatic cancers cause diabetes (high blood sugar) because they destroy the insulin-making cells. Symptoms can include feeling thirsty and hungry, and having to urinate often. More often, cancer can lead to small changes in blood sugar levels that don't cause symptoms of diabetes but can still be detected with blood tests.

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# Tests for Pancreatic Cancer

If a person has [signs and symptoms](#) that might be caused by pancreatic cancer, certain exams and tests will be done to find the cause. If cancer is found, more tests will be done to help determine the extent (stage) of the cancer.

## Medical history and physical exam

Your doctor will ask about your medical history to learn more about your symptoms. The doctor might also ask about possible risk factors, including smoking and your family history.

Your doctor will also examine you to look for signs of pancreatic cancer or other health problems. Pancreatic cancers can sometimes cause the liver or gallbladder to swell, which the doctor might be able to feel during the exam. Your skin and the whites of your eyes will also be checked for jaundice (yellowing).

If the results of the exam are abnormal, your doctor will probably order tests to help find the problem. You might also be referred to a gastroenterologist (a doctor who treats digestive system diseases) for further tests and treatment.

## Imaging tests

Imaging tests use x-rays, magnetic fields, sound waves, or radioactive substances to create pictures of the inside of your body. Imaging tests might be done for a number of reasons both before and after a diagnosis of pancreatic cancer, including:

- To look for suspicious areas that might be cancer
- To learn how far cancer may have spread
- To help determine if treatment is working
- To look for signs of cancer coming back after treatment

## Computed tomography (CT) scan

The [CT scan](#)<sup>1</sup> makes detailed cross-sectional images of your body. CT scans are often used to diagnose pancreatic cancer because they can show the pancreas fairly clearly. They can also help show if cancer has spread to organs near the pancreas, as well as to lymph nodes and distant organs. A CT scan can help determine if surgery might be a good treatment option.

If your doctor thinks you might have pancreatic cancer, you might get a special type of CT known as a **multiphase CT scan** or a **pancreatic protocol CT scan**. During this test, different sets of CT scans are taken over several minutes after you get an injection of an intravenous (IV) contrast.

**CT-guided needle biopsy:** CT scans can also be used to guide a biopsy needle into a suspected pancreatic tumor. But if a needle biopsy is needed, most doctors prefer to use endoscopic ultrasound (described below) to guide the needle into place.

## Magnetic resonance imaging (MRI)

[MRI scans](#)<sup>2</sup> use radio waves and strong magnets instead of x-rays to make detailed images of parts of your body. Most doctors prefer to look at the pancreas with CT scans, but an MRI might also be done.

Special types of MRI scans can also be used in people who might have pancreatic cancer or are at high risk:

- **MR cholangiopancreatography (MRCP)**, which can be used to look at the pancreatic and bile ducts, is described below in the section on cholangiopancreatography.
- **MR angiography (MRA)**, which looks at blood vessels, is mentioned below in the section on angiography.

## Ultrasound

[Ultrasound](#)<sup>3</sup> (US) tests use sound waves to create images of organs such as the pancreas. The two most commonly used types for pancreatic cancer are:

- **Abdominal ultrasound:** If it's not clear what might be causing a person's abdominal symptoms, this might be the first test done because it is easy to do and it doesn't expose a person to radiation. But if signs and symptoms are more likely to be caused by pancreatic cancer, a CT scan is often more useful.
- [Endoscopic ultrasound \(EUS\)](#)<sup>4</sup>: This test is more accurate than abdominal US and can be very helpful in diagnosing pancreatic cancer. This test is done with a small US probe on the tip of an endoscope, which is a thin, flexible tube that doctors use to look inside the digestive tract and to get biopsy samples of a tumor.

## Cholangiopancreatography

This is an imaging test that looks at the pancreatic ducts and bile ducts to see if they are blocked, narrowed, or dilated. These tests can help show if someone might have a pancreatic tumor that is blocking a duct. They can also be used to help plan surgery. The test can be done in different ways, each of which has pros and cons.

[Endoscopic retrograde cholangiopancreatography \(ERCP\)](#)<sup>5</sup>: For this test, an endoscope (a thin, flexible tube with a tiny video camera on the end) is passed down the throat,

through the esophagus and stomach, and into the first part of the small intestine. The doctor can see through the endoscope to find the ampulla of Vater (where the common bile duct empties into the small intestine).

X-rays taken at this time can show narrowing or blockage in these ducts that might be due to pancreatic cancer. The doctor doing this test can put a small brush through the tube to remove cells for a biopsy or place a [stent](#)<sup>6</sup> (small tube) into a bile or pancreatic duct to keep it open if a nearby tumor is pressing on it.

**Magnetic resonance cholangiopancreatography (MRCP):** This is a non-invasive way to look at the pancreatic and bile ducts using the same type of machine used for standard MRI scans. Unlike ERCP, it does not require an infusion of a contrast dye. Because this test is non-invasive, doctors often use MRCP if the purpose is just to look at the pancreatic and bile ducts. But this test can't be used to get biopsy samples of tumors or to place stents in ducts.

**Percutaneous transhepatic cholangiography (PTC):** In this procedure, the doctor puts a thin, hollow needle through the skin of the belly and into a bile duct within the liver. A contrast dye is then injected through the needle, and x-rays are taken as it passes through the bile and pancreatic ducts. As with ERCP, this approach can also be used to take fluid or tissue samples or to place a stent into a duct to help keep it open. Because it is more invasive (and might cause more pain), PTC is not usually used unless ERCP has already been tried or can't be done for some reason.

### Positron emission tomography (PET) scan

For a [PET scan](#)<sup>7</sup>, you are injected with a slightly radioactive form of sugar, which collects mainly in cancer cells. A special camera is then used to create a picture of areas of radioactivity in the body.

This test is sometimes used to look for spread from exocrine pancreatic cancers.

**PET/CT scan:** Special machines can do both a PET and CT scan at the same time. This lets the doctor compare areas of higher radioactivity on the PET scan with the more detailed appearance of that area on the CT scan. This test can help determine the [stage \(extent\) of the cancer](#). It might be especially useful for spotting cancer that has spread beyond the pancreas and wouldn't be treatable by surgery.

### Angiography

This is an x-ray test that looks at blood vessels. A small amount of contrast dye is

injected into an artery to outline the blood vessels, and then x-rays are taken.

An angiogram can show if blood flow in a particular area is blocked by a tumor. It can also show abnormal blood vessels (feeding the cancer) in the area. This test can be useful in finding out if a pancreatic cancer has grown through the walls of certain blood vessels. Mainly, it helps surgeons decide if the cancer can be removed completely without damaging vital blood vessels, and it can also help them plan the operation.

X-ray angiography can be uncomfortable because the doctor has to put a small catheter into the artery leading to the pancreas. Usually the catheter is put into an artery in your inner thigh and threaded up to the pancreas. A local anesthetic is often used to numb the area before inserting the catheter. Once the catheter is in place, the dye is injected to outline all the vessels while the x-rays are being taken.

Angiography can also be done with a CT scanner (CT angiography) or an MRI scanner (MR angiography). These techniques are now used more often because they can give the same information without the need for a catheter in the artery. You might still need an IV line so that a contrast dye can be injected into the bloodstream during the imaging.

## Blood tests

Several types of blood tests can be used to help diagnose pancreatic cancer or to help determine treatment options if it is found.

**Liver function tests:** Jaundice (yellowing of the skin and eyes) is often one of the first signs of pancreatic cancer. Doctors often get blood tests to assess liver function in people with jaundice to help determine its cause. Certain blood tests can look at levels of different kinds of bilirubin (a chemical made by the liver) and can help tell whether a patient's jaundice is caused by disease in the liver itself or by a blockage of bile flow (from a gallstone, a tumor, or other disease).

**Tumor markers:** Tumor markers are substances that can sometimes be found in the blood when a person has cancer. Tumor markers that may be helpful in pancreatic cancer are:

- **CA 19-9**
- **Carcinoembryonic antigen (CEA)**, which is not used as often as CA 19-9

Neither of these tumor marker tests is accurate enough to tell for sure if someone has pancreatic cancer. Levels of these tumor markers are not high in all people with

pancreatic cancer, and some people who don't have pancreatic cancer might have high levels of these markers for other reasons. Still, these tests can sometimes be helpful, along with other tests, in figuring out if someone has cancer.

In people already known to have pancreatic cancer and who have high CA19-9 or CEA levels, these levels can be measured over time to help tell how well treatment is working. If all of the cancer has been removed, these tests can also be done to look for signs the cancer may be coming back.

**Other blood tests:** Other tests, like a [CBC or chemistry panel](#)<sup>8</sup>, can help evaluate a person's general health (such as kidney and bone marrow function). These tests can help determine if they'll be able to withstand the stress of a major operation.

## Biopsy

A person's medical history, physical exam, and imaging test results may strongly suggest pancreatic cancer, but usually the only way to be sure is to remove a small sample of tumor and look at it under the microscope. This procedure is called a *biopsy*. Biopsies can be done in different ways.

**Percutaneous (through the skin) biopsy:** For this test, a doctor inserts a thin, hollow needle through the skin over the abdomen and into the pancreas to remove a small piece of a tumor. This is known as a *fine needle aspiration* (FNA). The doctor guides the needle into place using images from ultrasound or CT scans.

**Endoscopic biopsy:** Doctors can also biopsy a tumor during an endoscopy. The doctor passes an endoscope (a thin, flexible, tube with a small video camera on the end) down the throat and into the small intestine near the pancreas. At this point, the doctor can either use endoscopic ultrasound (EUS) to pass a needle into the tumor or endoscopic retrograde cholangiopancreatography (ERCP) to place a brush to remove cells from the bile or pancreatic ducts.

**Surgical biopsy:** Surgical biopsies are now done less often than in the past. They can be useful if the surgeon is concerned the cancer has spread beyond the pancreas and wants to look at (and possibly biopsy) other organs in the abdomen. The most common way to do a surgical biopsy is to use [laparoscopy](#)<sup>9</sup> (sometimes called *keyhole surgery*). The surgeon can look at the pancreas and other organs for tumors and take biopsy samples of abnormal areas.

### Some people might not need a biopsy



Rarely, the doctor might not do a biopsy on someone who has a tumor in the pancreas if imaging tests show the tumor is very likely to be cancer and if it looks like surgery can remove all of it. Instead, the doctor will proceed with surgery, at which time the tumor cells can be looked at in the lab to confirm the diagnosis. During surgery, if the doctor finds that the cancer has spread too far to be removed completely, only a sample of the cancer may be removed to confirm the diagnosis, and the rest of the planned operation will be stopped.

If treatment (such as chemotherapy or radiation) is planned before surgery, a biopsy is needed first to be sure of the diagnosis.

See [Testing Biopsy and Cytology Specimens for Cancer](#)<sup>10</sup> to learn more about different types of biopsies, how the biopsy samples are tested in the lab, and what the results will tell you.

## Hyperlinks

1. [www.cancer.org/treatment/understanding-your-diagnosis/tests/ct-scan-for-cancer.html](http://www.cancer.org/treatment/understanding-your-diagnosis/tests/ct-scan-for-cancer.html)
2. [www.cancer.org/treatment/understanding-your-diagnosis/tests/mri-for-cancer.html](http://www.cancer.org/treatment/understanding-your-diagnosis/tests/mri-for-cancer.html)
3. [www.cancer.org/treatment/understanding-your-diagnosis/tests/ultrasound-for-cancer.html](http://www.cancer.org/treatment/understanding-your-diagnosis/tests/ultrasound-for-cancer.html)
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9. [www.cancer.org/treatment/understanding-your-diagnosis/tests/endoscopy/laparoscopy.html](http://www.cancer.org/treatment/understanding-your-diagnosis/tests/endoscopy/laparoscopy.html)
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## Pancreatic Cancer Stages

After someone is diagnosed with pancreatic cancer, doctors will try to figure out if it has spread, and if so, how far. This process is called **staging**. The stage of a cancer describes how much cancer is in the body. It helps determine how serious the cancer is and how best to [treat](#)<sup>1</sup> it. Doctors also use a cancer's stage when talking about survival statistics.

The earliest stage pancreas cancers are stage 0 (carcinoma in situ), and then range from stages I (1) through IV (4). As a rule, the lower the number, the less the cancer has spread. A higher number, such as stage IV, means a more advanced cancer. Cancers with similar stages tend to have a similar outlook and are often treated in much the same way.

### How is the stage determined?

The staging system used most often for pancreatic cancer is the **AJCC** (American Joint Committee on Cancer) **TNM** system, which is based on 3 key pieces of information:

- The extent of the **tumor (T)**: How large is the tumor and has it grown outside the pancreas into nearby blood vessels?
- The spread to nearby lymph **nodes (N)**: Has the cancer spread to nearby lymph nodes? If so, how many of the lymph nodes have cancer?
- The spread (**metastasized**) to distant sites (**M**): Has the cancer spread to distant lymph nodes or distant organs such as the liver, peritoneum (the lining of the abdominal cavity), lungs or bones?

The system described below is the most recent AJCC system, effective January 2018. It is used to stage most pancreatic cancers except for well-differentiated pancreatic neuroendocrine tumors (NETs), which have their own staging system.

The staging system in the table uses the **pathologic stage**. It is determined by examining tissue removed during an operation. This is also known as the *surgical stage*. Sometimes, if the doctor's physical exam, imaging, or other tests show the tumor is too large or has spread to nearby organs and cannot be removed by surgery right away or at all, radiation or chemotherapy might be given first. In this case, the cancer will have a **clinical stage**. It is based on the results of physical exam, biopsy, and imaging tests (see [Tests for Pancreatic Cancer](#)). The clinical stage can be used to help plan treatment. Sometimes, though, the cancer has spread further than the clinical stage estimates, and may not predict the patient's outlook as accurately as a pathologic stage. For more information, see [Cancer Staging](#)<sup>2</sup>.

Numbers or letters after T, N, and M provide more details about each of these factors. Higher numbers mean the cancer is more advanced. Once a person's T, N, and M categories have been determined, this information is combined in a process called **stage grouping** to assign an overall stage.

Cancer staging can be complex. If you have any questions about your stage, please ask your doctor to explain it to you in a way you understand. (Additional information of the TNM system also follows the stage table below.)

## Stages of pancreatic cancer

AJCC Stage	Stage grouping	Stage description*
0	Tis	The cancer is confined to the top layers of pancreatic duct cells and

	N0 M0	has not invaded deeper tissues. It has not spread outside of the pancreas. These tumors are sometimes referred to as carcinoma <i>in situ</i> (Tis).  It has not spread to nearby lymph nodes (N0) or to distant sites (M0).
IA	T1 N0 M0	The cancer is confined to the pancreas and is no bigger than 2 cm (0.8 inch) across (T1).  It has not spread to nearby lymph nodes (N0) or to distant sites (M0).
IB	T2 N0 M0	The cancer is confined to the pancreas and is larger than 2 cm (0.8 inch) but no more than 4cm (1.6 inches) across (T2).  It has not spread to nearby lymph nodes (N0) or to distant sites (M0).
IIA	T3 N0 M0	The cancer is confined to the pancreas and is bigger than 4 cm (1.6 inches) across (T3).  It has not spread to nearby lymph nodes (N0) or to distant sites (M0).
IIB	T1 N1 M0	The cancer is confined to the pancreas and is no bigger than 2 cm (0.8 inch) across (T1) <b>AND</b> it has spread to no more than 3 nearby lymph nodes (N1).  It has not spread to distant sites (M0).
	T2 N1 M0	The cancer is confined to the pancreas and is larger than 2 cm (0.8 inch) but no more than 4cm (1.6 inches) across (T2) <b>AND</b> it has spread to no more than 3 nearby lymph nodes (N1).  It has not spread to distant sites (M0).
	T3 N1 M0	The cancer is confined to the pancreas and is bigger than 4 cm (1.6 inches) across (T3) <b>AND</b> it has spread to no more than 3 nearby lymph nodes (N1).  It has not spread to distant sites (M0).
III	T1 N2	The cancer is confined to the pancreas and is no bigger than 2 cm (0.8 inch) across (T1) <b>AND</b> it has spread to 4 or more nearby lymph nodes (N2).

	M0	It has not spread to distant sites (M0).
	OR	
	T2 N2	The cancer is confined to the pancreas and is larger than 2 cm (0.8 inch) but no more than 4cm (1.6 inches) across (T2) <b>AND</b> it has spread to 4 or more nearby lymph nodes (N2).
	M0	It has not spread to distant sites (M0).
	OR	
	T3 N2	The cancer is confined to the pancreas and is bigger than 4 cm (1.6 inches) across (T3) <b>AND</b> it has spread to 4 or more nearby lymph nodes (N2).
	M0	It has not spread to distant sites (M0).
	OR	
	T4 Any N	The cancer is growing outside the pancreas and into nearby major blood vessels (T4). The cancer may or may not have spread to nearby lymph nodes (Any N).
	M0	It has not spread to distant sites (M0).
IV	Any T Any N M1	The cancer has spread to distant sites such as the liver, peritoneum (the lining of the abdominal cavity), lungs or bones (M1). It can be any size (Any T) and might or might not have spread to nearby lymph nodes (Any N).

\* The following additional categories are not listed on the table above:

- TX: Main tumor cannot be assessed due to lack of information.
- T0: No evidence of a primary tumor.
- NX: Regional lymph nodes cannot be assessed due to lack of information.

## Other prognostic factors

Although not formally part of the TNM system, other factors are also important in determining a person's prognosis (outlook).

## Tumor grade

The grade describes how closely the cancer looks like normal tissue under a microscope.

- Grade 1 (G1) means the cancer looks much like normal pancreas tissue.
- Grade 3 (G3) means the cancer looks very abnormal.
- Grade 2 (G2) falls somewhere in between.

Low-grade cancers (G1) tend to grow and spread more slowly than high-grade (G3) cancers. Most of the time, Grade 3 pancreas cancers tend to have a poor prognosis (outlook) compared to Grade 1 or 2 cancers.

## Extent of resection

For patients who have surgery, another important factor is the extent of the resection — whether or not all of the tumor is removed:

- **R0:** All of the cancer is thought to have been removed. (There are no visible or microscopic signs suggesting that cancer was left behind.)
- **R1:** All visible tumor was removed, but lab tests of the removed tissue show that some small areas of cancer were probably left behind.
- **R2:** Some visible tumor could not be removed.

## Resectable versus unresectable pancreatic cancer

The AJCC staging system gives a detailed summary of how far the cancer has spread. But for treatment purposes, doctors use a simpler staging system, which divides cancers into groups based on whether or not they can be removed (resected) with surgery:

- Resectable
- Borderline resectable
- Unresectable (either locally advanced or metastatic)

## Resectable

If the cancer is only in the pancreas (or has spread just beyond it) and the surgeon believes the entire tumor can be removed, it is called resectable. (In general, this would include most stage IA, IB, and IIA cancers in the TNM system.)

It's important to note that some cancers might appear to be resectable based on [imaging tests](#)<sup>3</sup>, but once surgery is started it might become clear that not all of the cancer can be removed. If this happens, only some of the cancer may be removed to confirm the diagnosis (if a [biopsy](#)<sup>4</sup> hasn't been done already), and the rest of the planned operation will be stopped to help avoid the risk of major side effects.

### **Borderline resectable**

This term is used to describe some cancers that might have just reached nearby blood vessels, but which the doctors feel might still be removed completely with surgery.

### **Unresectable**

These cancers can't be removed entirely by surgery.

**Locally advanced:** If the cancer has not yet spread to distant organs but it still can't be removed completely with surgery, it is called locally advanced. Often the reason the cancer can't be removed is because it has grown into or surrounded nearby major blood vessels. (This would include some stage III cancers in the TNM system.)

Surgery to try to remove these tumors would be very unlikely to be helpful and could still have major side effects. Some type of surgery might still be done, but it would be a less extensive operation with the goal of preventing or relieving symptoms or problems like a blocked bile duct or intestinal tract, instead of trying to cure the cancer.

**Metastatic:** If the cancer has spread to distant organs, it is called metastatic (Stage IV). These cancers can't be removed completely. Surgery might still be done, but the goal would be to prevent or relieve symptoms, not to try to cure the cancer.

### **Tumor markers (CA 19-9)**

Tumor markers are substances that can sometimes be found in the blood when a person has cancer. CA 19-9 is a tumor marker that may be helpful in pancreatic cancer. A drop in the CA 19-9 level after surgery (compared to the level before surgery) and low levels of CA 19-9 after pancreas surgery tend to predict a better prognosis (outlook).

### **Hyperlinks**

1. [www.cancer.org/cancer/pancreatic-cancer/treating.html](http://www.cancer.org/cancer/pancreatic-cancer/treating.html)
2. [www.cancer.org/treatment/understanding-your-diagnosis/staging.html](http://www.cancer.org/treatment/understanding-your-diagnosis/staging.html)
3. [www.cancer.org/treatment/understanding-your-diagnosis/tests.html](http://www.cancer.org/treatment/understanding-your-diagnosis/tests.html)
4. [www.cancer.org/treatment/understanding-your-diagnosis/tests/testing-biopsy-and-cytology-specimens-for-cancer.html](http://www.cancer.org/treatment/understanding-your-diagnosis/tests/testing-biopsy-and-cytology-specimens-for-cancer.html)

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# Survival Rates for Pancreatic Cancer

Survival rates can give you an idea of what percentage of people with the same type and stage of cancer are still alive a certain amount of time (usually 5 years) after they were diagnosed. They can't tell you how long you will live, but they may help give you a better understanding of how likely it is that your treatment will be successful.

**Keep in mind that survival rates are estimates and are often based on previous outcomes of large numbers of people who had a specific cancer, but they can't predict what will happen in any particular person's case. These statistics can be confusing and may lead you to have more questions. Talk with your doctor about how these numbers may apply to you, as he or she is familiar with your situation.**

## What is a 5-year relative survival rate?

A **relative survival rate** compares people with the same type and stage of pancreatic cancer to people in the overall population. For example, if the **5-year relative survival rate** for a specific stage of pancreatic cancer is 50%, it means that people who have



that cancer are, on average, about 50% as likely as people who don't have that cancer to live for at least 5 years after being diagnosed.

### Where do these numbers come from?

The American Cancer Society relies on information from the SEER\* database, maintained by the National Cancer Institute (NCI), to provide survival statistics for different types of cancer.

The SEER database tracks 5-year relative survival rates for pancreatic cancer in the United States, based on how far the cancer has spread. The SEER database, however, does not group cancers by [AJCC TNM stages](#) (stage 1, stage 2, stage 3, etc.). Instead, it groups cancers into localized, regional, and distant stages:

- **Localized:** There is no sign that the cancer has spread outside of the pancreas. This includes stage 0, I, and IIA cancers.
- **Regional:** The cancer has spread from the pancreas to nearby structures or lymph nodes. This includes mainly stage IIB and III cancers.
- **Distant:** The cancer has spread to distant parts of the body such as the lungs, liver or bones. For pancreatic cancer, this includes stage IV cancers.

### 5-year relative survival rates for pancreatic cancer

(Based on people diagnosed with pancreatic cancer between 2008 and 2014.)

SEER Stage	5-year Relative Survival Rate
Localized	34%
Regional	12%
Distant	3%
All SEER stages combined	9%

### Understanding the numbers

- **These numbers apply only to the stage of the cancer when it is first diagnosed.** They do not apply later on if the cancer grows, spreads, or comes back after treatment.

- **These numbers don't take everything into account.** Survival rates are grouped based on how far the cancer has spread, but your age, overall health, how well the cancer responds to treatment, [tumor grade, extent of resection, level of tumor marker \(CA 19-9\)](#) and other factors will also affect your outlook.
- **People now being diagnosed with pancreatic cancer may have a better outlook than these numbers show.** Treatments improve over time, and these numbers are based on people who were diagnosed and treated at least five years earlier.

\*SEER= Surveillance, Epidemiology, and End Results

## References

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Survival rates tell you what portion of people with the same type and stage of cancer are still alive a certain amount of time (usually 5 years) after they were diagnosed. These numbers can't tell you how long you will live, but they may help give you a better understanding about how likely it is that your treatment will be successful. Some people will want to know the survival rates for their cancer, and some people won't.

## What is a 5-year survival rate?

Statistics on the outlook for a certain type and stage of cancer are often given as 5-year survival rates. **The 5-year survival rate is the percentage of people who live at least 5 years after being diagnosed with cancer.** For example, a 5-year survival rate of 90% means that an estimated 90 out of 100 people who have that cancer are still alive 5 years after being diagnosed. Keep in mind, however, that many of these people live much longer than 5 years after diagnosis.

Remember that all survival rates are estimates – your outlook can vary based on a number of factors specific to you.

## Survival rates don't tell the whole story

Survival rates are often based on previous outcomes of large numbers of people who had the disease, but they can't predict what will happen in any particular person's case. There are a number of limitations to remember:

- The numbers below are among the most current available. But to get 5-year survival rates, doctors have to look at people who were treated at least 5 years ago. As treatments are improving over time, people who are now being diagnosed with pancreatic cancer may have a better outlook than these statistics show.
- These statistics are based on the stage of the cancer when it was first diagnosed. They do not apply to cancers that later come back or spread, for example.
- The outlook for people with pancreatic cancer varies by the stage (extent) of the cancer – in general, the survival rates are higher for people with earlier stage cancers. But many other factors can affect a person's outlook, such as their age and overall health, and how well the cancer responds to treatment. The outlook for each person is specific to his or her circumstances.

Your doctor can tell you how these numbers may apply to you.

## Survival rates for pancreatic cancer

Remember, these survival rates are only estimates – they can't predict what will happen to any individual person. We understand that these statistics can be confusing and may lead you to have more questions. Talk to your doctor to better understand your specific situation.

The numbers below come from the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) database, looking at people diagnosed with pancreatic cancer between 2008 and 2014. The SEER database doesn't divide survival rates by AJCC TNM stage. Instead, it divides cancers into 3 larger, summary stages:

- **Localized** means that the cancer is only growing in the pancreas. This usually includes Stage 0 and I cancers).
- **Regional** means that the cancer has spread to nearby lymph nodes or tissues. This typically includes Stage II and III cancers.

- **Distant** means that the cancer has spread to organs or lymph nodes away from the tumor, and includes all stage IV cancers.

In general, people who can be treated with surgery tend to live longer than those not treated with surgery.

Stage	5-Year Relative Survival Rate
Localized	34%
Regional	12%
Distant	3%

## Questions to Ask About Pancreatic Cancer

It's important to have honest, open discussions with your cancer care team. They want to answer all of your questions, so that you can make informed treatment and life decisions. Here are some questions to consider:

### When you're told you have pancreatic cancer

- What [kind of pancreatic cancer](#)<sup>1</sup> do I have?
- Has my cancer spread beyond the pancreas?
- What is the [stage](#) of my cancer? Is it resectable (removable by surgery)?
- Will I need any other [tests](#) before we can decide on treatment?
- Do I need to see any other doctors or health professionals?
- If I'm concerned about the costs and insurance coverage for my diagnosis and treatment, who can help me?

### When deciding on a treatment plan

- What are my [treatment options](#)<sup>2</sup>?
- What do you recommend and why?
- How much experience do you have treating this type of cancer?

- What is the goal of each treatment?
- Should I get a [second opinion](#)<sup>3</sup>? How do I do that? Can you recommend a doctor or cancer center?
- How is treatment likely to help me?
- How quickly do we need to decide on treatment?
- Should I think about taking part in a [clinical trial](#)<sup>4</sup>?
- How soon do I need to start treatment?
- What should I do to be ready for treatment?
- How long will treatment last? What will it be like? Where will it be done?
- What risks or side effects should I expect? How long are they likely to last?
- Will treatment affect how I eat?
- Will treatment affect my daily activities?
- What will we do if the treatment doesn't work or if the cancer [comes back](#)<sup>5</sup>?

## During treatment

Once treatment begins, you'll need to know what to expect and what to look for. Not all of these questions may apply to you, but asking the ones that do may be helpful.

- How will we know if the treatment is working?
- Is there anything I can do to help manage [side effects](#)<sup>6</sup>?
- What symptoms or side effects should I tell you about right away?
- How can I reach you on nights, holidays, or weekends?
- Do I need to change what I eat during treatment?
- Are there any limits on what I can do?
- Can I exercise during treatment? If so, what kind should I do, and how often?
- Can you suggest a mental health professional I can see if I start to feel [overwhelmed, depressed, or distressed](#)<sup>7</sup>?
- What if I need social support during treatment because my family lives far away?

## After treatment

- Are there any limits on what I can do?
- Do I need a special diet after treatment?
- What symptoms should I watch for?
- What kind of exercise should I do now?

- What type of [follow-up](#)<sup>8</sup> will I need after treatment?
- How often will I need to have follow-up exams and tests?
- How will we know if the cancer has come back? What should I watch for?
- What will my options be if the cancer comes back?

Along with these sample questions, be sure to write down some of your own. For instance, you might want more information about recovery times. You may also want to ask about about [clinical trials](#)<sup>9</sup> for which you may qualify.

## Hyperlinks

1. [www.cancer.org/cancer/pancreatic-cancer/about/what-is-pancreatic-cancer.html](http://www.cancer.org/cancer/pancreatic-cancer/about/what-is-pancreatic-cancer.html)
2. [www.cancer.org/cancer/pancreatic-cancer/treating.html](http://www.cancer.org/cancer/pancreatic-cancer/treating.html)
3. [www.cancer.org/treatment/finding-and-paying-for-treatment/choosing-your-treatment-team/seeking-a-second-opinion.html](http://www.cancer.org/treatment/finding-and-paying-for-treatment/choosing-your-treatment-team/seeking-a-second-opinion.html)
4. [www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html](http://www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html)
5. [www.cancer.org/treatment/survivorship-during-and-after-treatment/understanding-recurrence.html](http://www.cancer.org/treatment/survivorship-during-and-after-treatment/understanding-recurrence.html)
6. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html)
7. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/changes-in-mood-or-thinking.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/changes-in-mood-or-thinking.html)
8. [www.cancer.org/cancer/pancreatic-cancer/after-treatment.html](http://www.cancer.org/cancer/pancreatic-cancer/after-treatment.html)
9. <https://www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html>

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## Treating Pancreatic Cancer

If you've been diagnosed with pancreatic cancer, your cancer care team will discuss your treatment options with you. It's important to weigh the benefits of each treatment option against the possible risks and side effects.

### How is pancreatic cancer treated?

Depending on the type and stage of the cancer and other factors, treatment options for people with pancreatic cancer can include:

- [Surgery for Pancreatic Cancer](#)
- [Ablation or Embolization Treatments for Pancreatic Cancer](#)
- [Radiation Therapy for Pancreatic Cancer](#)
- [Chemotherapy for Pancreatic Cancer](#)
- [Targeted Therapy for Pancreatic Cancer](#)
- [Immunotherapy for Pancreatic Cancer](#)
- [Pain Control for Pancreatic Cancer](#)

### Common treatment approaches

Sometimes, the best option for treating pancreatic cancer might include more than one type of treatment.

- [Treating Pancreatic Cancer, Based on Extent of the Cancer](#)

### Who treats pancreatic cancer?

The doctors on your cancer treatment team might include:

- A **surgical oncologist**: a doctor who specializes in treating cancer with surgery
- A **radiation oncologist**: a doctor who specializes in treating cancer with radiation therapy
- A **medical oncologist**: a doctor who specializes in treating cancer with chemotherapy, immunotherapy, and targeted therapy
- A **gastroenterologist**: a doctor who specializes in diagnosing and treating diseases of the digestive system.

Many other specialists may be involved in your care as well, including nurse practitioners, nurses, psychologists, social workers, rehabilitation specialists, and other health professionals.

- [Health Professionals Associated With Cancer Care<sup>1</sup>](#)

### **Making treatment decisions**

It's important to discuss all of your treatment options, including their goals and possible side effects, with your doctors to help make the decision that best fits your needs. Some important things to consider include:

- Your age and expected life span
- Any other serious health conditions you have
- The stage (extent) of your cancer
- Whether or not surgery can remove (resect) the cancer
- The likelihood that treatment will cure the cancer (or help in some other way)
- Your feelings about the possible side effects from treatment

You may feel that you must make a decision quickly, but it's important to give yourself time to absorb the information you have just learned. Ask questions if there is anything you're not sure about.

If time permits, it is often a good idea to seek a second opinion. A second opinion can give you more information and help you feel more confident about the treatment plan you choose.

- [Questions to Ask About Pancreatic Cancer<sup>2</sup>](#)
- [Seeking a Second Opinion<sup>3</sup>](#)



## Thinking about taking part in a clinical trial

Clinical trials are carefully controlled research studies that are done to get a closer look at promising new treatments or procedures. Clinical trials are one way to get state-of-the-art cancer treatment. In some cases they may be the only way to get access to newer treatments. They are also the best way for doctors to learn better methods to treat cancer. Still, they're not right for everyone.

If you would like to learn more about clinical trials that might be right for you, start by asking your doctor if your clinic or hospital conducts clinical trials.

- [Clinical Trials](#)<sup>4</sup>

## Considering complementary and alternative methods

You may hear about alternative or complementary methods that your doctor hasn't mentioned to treat your cancer or relieve symptoms. These methods can include vitamins, herbs, and special diets, or other methods such as acupuncture or massage, to name a few.

Complementary methods refer to treatments that are used along with your regular medical care. Alternative treatments are used instead of a doctor's medical treatment. Although some of these methods might be helpful in relieving symptoms or helping you feel better, many have not been proven to work. Some might even be harmful.

Be sure to talk to your cancer care team about any method you are thinking about using. They can help you learn what is known (or not known) about the method, which can help you make an informed decision.

- [Complementary and Alternative Medicine](#)<sup>5</sup>

## Help getting through cancer treatment

Your cancer care team will be your first source of information and support, but there are other resources for help when you need it. Hospital- or clinic-based support services are an important part of your care. These might include nursing or social work services, financial aid, nutritional advice, rehab, or spiritual help.

The American Cancer Society also has programs and services – including rides to treatment, lodging, and more – to help you get through treatment. Call our National Cancer Information Center at 1-800-227-2345 and speak with one of our trained

specialists.

- [Find Support Programs and Services in Your Area](#)<sup>6</sup>

### **Choosing to stop treatment or choosing no treatment at all**

For some people, when treatments have been tried and are no longer controlling the cancer, it could be time to weigh the benefits and risks of continuing to try new treatments. Whether or not you continue treatment, there are still things you can do to help maintain or improve your quality of life.

Some people, especially if the cancer is advanced, might not want to be treated at all. There are many reasons you might decide not to get cancer treatment, but it's important to talk to your doctors and you make that decision. Remember that even if you choose not to treat the cancer, you can still get supportive care to help with pain or other symptoms.

- [If Cancer Treatments Stop Working](#)<sup>7</sup>
- [Palliative or Supportive Care](#)<sup>8</sup>

*The treatment information given here is not official policy of the American Cancer Society and is not intended as medical advice to replace the expertise and judgment of your cancer care team. It is intended to help you and your family make informed decisions, together with your doctor. Your doctor may have reasons for suggesting a treatment plan different from these general treatment options. Don't hesitate to ask him or her questions about your treatment options.*

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## **Surgery for Pancreatic Cancer**

Two general types of surgery can be used for pancreatic cancer:

- **Potentially curative surgery** is used when the results of exams and tests suggest that it's possible to remove (resect) all the cancer.
- **Palliative surgery** may be done if tests show that the cancer is too widespread to be removed completely. This surgery is done to relieve symptoms or to prevent certain complications like a blocked bile duct or intestine, but the goal is not to cure

the cancer.

## Staging laparoscopy

To determine which type of surgery might be best, it's important to know the [stage](#)<sup>1</sup> (extent) of the cancer. But it can be hard to stage pancreatic cancer accurately just using [imaging tests](#)<sup>2</sup>. Sometimes laparoscopy is done first to help determine the extent of the cancer and if it can be resected.

For this procedure, the surgeon makes a few small incisions (cuts) in the abdomen (belly) and inserts long, thin instruments. One of these has a small video camera on the end so the surgeon can see inside the abdomen and look at the pancreas and other organs. [Biopsy](#)<sup>3</sup> samples of tumors and other abnormal areas can show how far the cancer has spread.

## Potentially curative surgery

Studies have shown that removing only part of a pancreatic cancer doesn't help patients live longer, so potentially curative surgery is only done if the surgeon thinks all of the cancer can be removed.

This is a very complex surgery and it can be very hard for patients. It can cause complications and might take weeks or months to recover from fully. If you're thinking about having this type of surgery, it's important to weigh the potential benefits and risks carefully.

Fewer than 1 in 5 pancreatic cancers appear to be confined to the pancreas at the time they are found. Even then, not all of these cancers turn out to be truly resectable (able to be completely removed). Sometimes after the surgeon starts the operation it becomes clear that the cancer has grown too far to be completely taken out. If this happens, the operation may be stopped, or the surgeon might continue with a smaller operation with a goal of relieving or preventing symptoms (see "Palliative surgery" below). This is because the planned operation would be very unlikely to cure the cancer and could still lead to major side effects. It would also lengthen the recovery time, which could delay other treatments.

Surgery offers the only realistic chance to cure pancreatic cancer, but it doesn't always lead to a cure. Even if all visible cancer is removed, often some cancer cells have already spread to other parts of the body. These cells can grow into new tumors over

time, which can be hard to treat.

Curative surgery is done mainly to treat cancers in the head of the pancreas. Because these cancers are near the bile duct, they often cause jaundice, which sometimes allows them to be found early enough to be removed completely. Surgeries for other parts of the pancreas are described below, and are done if it's possible to remove all of the cancer.

### **Whipple procedure (pancreaticoduodenectomy)**

This is the most common operation to remove a cancer in the head of the pancreas.

During this operation, the surgeon removes the head of the pancreas and sometimes the body of the pancreas as well. Nearby structures such as part of the small intestine, part of the bile duct, the gallbladder, lymph nodes near the pancreas, and sometimes part of the stomach are also removed. The remaining bile duct and pancreas are then attached to the small intestine so that bile and digestive enzymes can still go into the small intestine. The end pieces of the small intestine (or the stomach and small intestine) are then reattached so that food can pass through the digestive tract (gut).

Most often, this operation is done through a large incision (cut) down the middle of the belly. Some doctors at major cancer centers also do the operation laparoscopically, which is sometimes known as [keyhole surgery](#)<sup>4</sup> (see [What's New in Pancreatic Cancer Research?](#)<sup>5</sup>).

A Whipple procedure is a very complex operation that requires a surgeon with a lot of skill and experience. It carries a relatively high risk of complications that can be life threatening. When the operation is done in small hospitals or by doctors with less experience, as many as 15% of patients may die as a result of surgical complications. In contrast, when the operation is done in cancer centers by surgeons experienced in the procedure, fewer than 5% of patients die as a direct result of surgery.

To have the best outcome, it's important to be treated by a surgeon who does many of these operations and to have the surgery at a hospital where many of them are done. In general, people having this type of surgery do better when it's done at a hospital that does at least 15 to 20 Whipple procedures per year.

Still, even under the best circumstances, many patients have complications from the surgery. These can include:

- Leaking from the various connections between organs that the surgeon has to join

- Infections
- Bleeding
- Trouble with the stomach emptying after eating
- Trouble digesting some foods (which might require taking some pills to help with digestion)
- Weight loss
- Changes in bowel habits
- Diabetes

### **Distal pancreatectomy**

In this operation, the surgeon removes only the tail of the pancreas or the tail and a portion of the body of the pancreas. The spleen is usually removed as well. The spleen helps the body fight infections, so if it's removed you'll be at increased risk of infection with certain bacteria. To help with this, doctors recommend that patients get certain vaccines before this surgery.

This surgery is used to treat cancers found in the tail and body of the pancreas. Unfortunately, many of these tumors have usually already spread by the time they are found and surgery is not always an option.

### **Total pancreatectomy**

This operation removes the entire pancreas, as well as the gallbladder, part of the stomach and small intestine, and the spleen. This surgery might be an option if the cancer has spread throughout the pancreas but can still be removed. But this type of surgery is used less often than the other operations because there doesn't seem to be a major advantage in removing the whole pancreas, and it can have major side effects.

It's possible to live without a pancreas. But when the entire pancreas is removed, people are left without the cells that make insulin and other hormones that help maintain safe blood sugar levels. These people develop diabetes, which can be hard to manage because they are totally dependent on insulin shots. People who have had this surgery also need to take pancreatic enzyme pills to help them digest certain foods.

Before you have this operation, your doctor will recommend that you get certain vaccines because the spleen will be removed.

### **Palliative surgery**

If the cancer has spread too far to be removed completely, any surgery being considered would be palliative (intended to relieve symptoms). Because pancreatic cancer can spread quickly, most doctors don't advise major surgery for palliation, especially for people who are in poor health.

Sometimes surgery might be started with the hope it will cure the patient, but once it begins the surgeon discovers this is not possible. In this case, the surgeon might do a less extensive, palliative operation known as *bypass surgery* to help relieve symptoms.

Cancers growing in the head of the pancreas can block the common bile duct as it passes through this part of the pancreas. This can cause pain and digestive problems because bile can't get into the intestine. The bile chemicals will also build up in the body, which can cause jaundice, nausea, vomiting, and other problems. There are two main options to relieve bile duct blockage in this situation:

### **Stent placement**

The most common approach to relieving a blocked bile duct does not involve actual surgery. Instead, a stent (small tube, usually made of metal) is put inside the duct to keep it open. This is usually done through an endoscope (a long, flexible tube) while you are sedated. Often this is part of an [endoscopic retrograde cholangiopancreatography \(ERCP\)](#)<sup>6</sup>. The doctor passes the endoscope down the throat and all the way into the small intestine. Through the endoscope, the doctor can then put the stent into the bile duct. The stent can also be put in place through the skin during a percutaneous transhepatic cholangiography (PTC). (See [Tests for Pancreatic Cancer](#)<sup>7</sup>.)

The stent helps keep the bile duct open even if the surrounding cancer presses on it. But after several months, the stent may become clogged and may need to be cleared or replaced. Larger stents can also be used to keep parts of the small intestine open if they are in danger of being blocked by the cancer.

A bile duct stent can also be put in to help relieve jaundice before curative surgery is done (which would typically be a couple of weeks later). This can help lower the risk of complications from surgery.

### **Bypass surgery**

In people who are healthy enough, another option for relieving a blocked bile duct is surgery to reroute the flow of bile from the common bile duct directly into the small intestine, bypassing the pancreas. This typically requires a large incision (cut) in the abdomen, and it can take weeks to recover from this. Sometimes surgery can be done

through several small cuts in the abdomen using special long surgical tools. (This is known as [laparoscopic or keyhole surgery](#)<sup>8</sup>.)

Having a stent placed is often easier and the recovery is much shorter, which is why this is done more often than bypass surgery. But surgery can have some advantages, such as:

- It can often give longer-lasting relief than a stent, which might need to be cleaned out or replaced.
- It might be an option if a stent can't be placed for some reason.
- During surgery, the surgeon may be able to cut some of the nerves around the pancreas or inject them with alcohol. Because pancreatic cancer often causes pain if it reaches these nerves, this procedure may reduce or get rid of any pain caused by the cancer.

Sometimes, the end of the stomach is disconnected from the duodenum (the first part of the small intestine) and attached farther down the small intestine during this surgery as well. This is known as a *gastric bypass*. This is done because over time the cancer might grow large enough to block the duodenum, which can cause pain and vomiting and often requires urgent surgery. Bypassing the duodenum before this happens can sometimes help avoid this.

Bypass surgery can still be a major operation, so it's important that you are healthy enough to tolerate it and that you talk with your doctor about the possible benefits and risks before you have the surgery.

For more about surgery as a treatment for cancer, see [Cancer Surgery](#)<sup>9</sup>.

## Hyperlinks

1. [www.cancer.org/cancer/pancreatic-cancer/detection-diagnosis-staging/staging.html](http://www.cancer.org/cancer/pancreatic-cancer/detection-diagnosis-staging/staging.html)
2. [www.cancer.org/cancer/pancreatic-cancer/detection-diagnosis-staging/how-diagnosed.html](http://www.cancer.org/cancer/pancreatic-cancer/detection-diagnosis-staging/how-diagnosed.html)
3. [www.cancer.org/cancer/pancreatic-cancer/detection-diagnosis-staging/how-diagnosed.html](http://www.cancer.org/cancer/pancreatic-cancer/detection-diagnosis-staging/how-diagnosed.html)
4. [www.cancer.org/treatment/understanding-your-diagnosis/tests/endoscopy/laparoscopy.html](http://www.cancer.org/treatment/understanding-your-diagnosis/tests/endoscopy/laparoscopy.html)
5. [www.cancer.org/cancer/pancreatic-cancer/about/new-research.html](http://www.cancer.org/cancer/pancreatic-cancer/about/new-research.html)

6. [www.cancer.org/treatment/understanding-your-diagnosis/tests/endoscopy/upper-endoscopy.html](http://www.cancer.org/treatment/understanding-your-diagnosis/tests/endoscopy/upper-endoscopy.html)
7. [www.cancer.org/cancer/pancreatic-cancer/detection-diagnosis-staging/how-diagnosed.html](http://www.cancer.org/cancer/pancreatic-cancer/detection-diagnosis-staging/how-diagnosed.html)
8. [www.cancer.org/treatment/understanding-your-diagnosis/tests/endoscopy/laparoscopy.html](http://www.cancer.org/treatment/understanding-your-diagnosis/tests/endoscopy/laparoscopy.html)
9. [www.cancer.org/treatment/treatments-and-side-effects/treatment-types/surgery.html](http://www.cancer.org/treatment/treatments-and-side-effects/treatment-types/surgery.html)

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# Ablation or Embolization Treatments for Pancreatic Cancer



Ablation and embolization treatments are different ways of destroying tumors, rather than removing them with surgery. They are used much less often for pancreatic cancers but can sometimes be used to help treat pancreatic cancer that has spread to other organs, especially the liver.

These treatments are very unlikely to cure cancers on their own. They are more likely to be used to help prevent or relieve symptoms, when there are only a few areas of spread, and are often used along with other types of treatment.

## Ablative treatments

Ablation refers to treatments that destroy tumors, usually with extreme heat or cold. They are generally best for tumors no more than about 2 cm (a little less than an inch) across. Typically, with this type of treatment you will not need to stay in the hospital. There are different kinds of ablative treatments:

**Radiofrequency ablation (RFA)** uses high-energy radio waves for treatment. A thin, needle-like probe is put through the skin and into the tumor. Placement of the probe is guided by ultrasound or CT scans. The tip of the probe releases a high-frequency electric current which heats the tumor and destroys the cancer cells.

**Microwave thermotherapy** is similar to RFA, except it uses microwaves to heat and destroy the cancer cells.

**Ethanol (alcohol) ablation** (also known as *percutaneous ethanol injection*) kills the cancer cells by injecting concentrated alcohol directly into the tumor. This is usually done through the skin using a needle guided by ultrasound or CT scans.

**Cryosurgery (also known as cryotherapy or cryoablation)** destroys a tumor by freezing it with a thin metal probe. The probe is guided through the skin and into the tumor, using ultrasound. Then very cold gasses are passed through the probe to freeze the tumor, killing the cancer cells. This method may be used to treat larger tumors than the other ablation techniques, but it sometimes requires general anesthesia (where you are put into a deep sleep).

## Side effects of ablation treatments

Possible [side effects](#)<sup>1</sup> after ablation therapy include abdominal pain, infection, and bleeding inside the body. Serious complications are uncommon, but they are possible.

## Embolization

During embolization, substances are injected into an artery to try to block the blood flow to cancer cells, causing them to die. This may be used for larger tumors (up to about 5 cm or 2 inches across) in the liver.

There are 3 main types of embolization:

**Arterial embolization** (also known as *trans-arterial embolization* or *TAE*) involves putting a catheter (a thin, flexible tube) into an artery through a small cut in the inner thigh and threaded up into the hepatic artery feeding the tumor. Blood flow is blocked (or reduced) by injecting materials that plug up that artery. Most of the healthy liver cells will not be affected because they get their blood supply from a different blood vessel, the portal vein.

**Chemoembolization** (also known as *trans-arterial chemoembolization* or *TACE*) combines embolization with [chemotherapy](#). Most often, this is done by using tiny beads that give off a chemotherapy drug during the embolization. TACE can also be done by giving chemotherapy through the catheter directly into the artery, then plugging up the artery.

**Radioembolization** combines embolization with [radiation therapy](#). In the United States, this is done by injecting small radioactive beads (called *microspheres*) into the hepatic artery. The beads lodge in the blood vessels near the tumor, where they give off small amounts of radiation to the tumor site. Since the radiation travels a very short distance, its effects are limited mainly to the tumor.

### Side effects of embolization

Possible [side effects](#)<sup>2</sup> after embolization include abdominal pain, fever, nausea, infection, and blood clots in nearby blood vessels. Serious complications are not common, but they can happen.

## Hyperlinks

1. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html)
2. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html)

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## Radiation Therapy for Pancreatic Cancer

Radiation therapy uses high-energy x-rays (or particles) to kill cancer cells. It can be helpful in treating some pancreatic cancers.

### When might radiation therapy be used?

- Radiation might be given after [surgery](#) (known as *adjuvant* treatment) to try to lower the chance of the cancer coming back. The radiation is typically given along with [chemotherapy](#), which is together known as *chemoradiation* or *chemoradiotherapy*.
- For borderline resectable tumors, radiation might be given along with chemotherapy before surgery (*neoadjuvant* treatment) to try to shrink the tumor and make it easier to remove completely.
- Radiation therapy combined with chemotherapy may be used as part of the main treatment in people whose cancers have grown beyond the pancreas and can't be removed by surgery (locally advanced/unresectable cancers).
- Radiation is sometimes used to help relieve symptoms (such as pain) in people with advanced cancers or in people who aren't healthy enough for other treatments like surgery.

## How is radiation therapy given?

The type of radiation most often used to treat pancreatic cancer, known as [external beam radiation therapy](#)<sup>1</sup>, focuses radiation from a source outside of the body on the cancer.

Getting radiation therapy is much like getting an x-ray, but the radiation is stronger. The procedure itself is painless. Each treatment lasts only a few minutes, although the setup time – getting you into place for treatment – usually takes longer. Most often, radiation treatments are given 5 days a week for several weeks.

## Possible side effects

Some of the more common side effects of radiation therapy include:

- Skin changes in areas getting radiation, ranging from redness to blistering and peeling
- Nausea and vomiting
- Diarrhea
- Fatigue
- Loss of appetite
- Weight loss

Radiation can also lower blood counts, which can increase the risk of serious infection.

Usually these effects go away within a few weeks after the treatment is complete. Ask your doctor what side effects to expect and how to prevent or relieve them.

## More information about radiation therapy

To learn more about how radiation is used to treat cancer, see [Radiation Therapy](#)<sup>2</sup>.

To learn about some of the side effects listed here and how to manage them, see [Managing Cancer-related Side Effects](#)<sup>3</sup>.

## Hyperlinks

1. [www.cancer.org/treatment/treatments-and-side-effects/treatment-types/radiation/external-beam-radiation-therapy.html](http://www.cancer.org/treatment/treatments-and-side-effects/treatment-types/radiation/external-beam-radiation-therapy.html)

2. [www.cancer.org/treatment/treatments-and-side-effects/treatment-types/radiation.html](http://www.cancer.org/treatment/treatments-and-side-effects/treatment-types/radiation.html)
3. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html)

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# Chemotherapy for Pancreatic Cancer

Chemotherapy (chemo) is an anti-cancer drug injected into a vein or taken by mouth. These drugs enter the bloodstream and reach almost all areas of the body, making this treatment potentially useful for cancers whether or not they have spread.

## When might chemotherapy be used?

Chemo is often part of the treatment for pancreatic cancer and may be used at any stage:

- **Before surgery (neoadjuvant chemotherapy):** Chemo can be given *before surgery* (sometimes along with radiation) to try to shrink the tumor so it can be removed with less extensive surgery. Neoadjuvant chemo is often used to treat cancers that are too big to be removed by surgery at the time of diagnosis (called **locally advanced cancers**).
- **After surgery (adjuvant chemotherapy):** Chemo can be used *after surgery* (sometimes along with radiation) to try to kill any cancer cells that have been left behind or have spread but can't be seen, even on imaging tests. If these cells were allowed to grow, they could form new tumors in other places in the body. This type of treatment might lower the chance that the cancer will come back later.
- **For advanced pancreatic cancer:** Chemo can be used when the cancer is advanced and can't be removed completely with surgery, or if surgery isn't an option, or if the cancer has spread to other organs.

When chemo is given along with radiation, it is known as *chemoradiation*. It helps the radiation work better, but can also have more side effects.

## Which chemo drugs are used for pancreatic cancer?

In most cases (especially as adjuvant or neoadjuvant treatment), chemo is most effective when combinations of drugs are used. For people who are healthy enough, 2 or more drugs are usually given together. For people who are not healthy enough for combined treatments, a single drug (usually gemcitabine, 5-FU, or capecitabine) can be used.

**The most common drugs used for adjuvant and neoadjuvant chemo include:**

- Gemcitabine (Gemzar)
- 5-fluorouracil (5-FU)

- Oxaliplatin (Eloxatin)
- Albumin-bound paclitaxel (Abraxane)
- Capecitabine (Xeloda)
- Cisplatin
- Irinotecan (Camptosar)

### **Chemotherapy for advanced pancreatic cancer**

- Gemcitabine (Gemzar)
- 5-fluorouracil (5-FU) or Capecitabine (Xeloda) (an oral 5FU drug)
- Irinotecan (Camptosar) or Liposomal Irinotecan (Onivyde)
- Platinum agents : Cisplatin and Oxaliplatin (Eloxatin)
- Taxanes: Paclitaxel (Taxol), Docetaxel (Taxotere), and Albumin-bound paclitaxel (Abraxane)

### **How is chemotherapy given?**

Chemo drugs for pancreatic cancer can be given into a vein (IV) or by mouth as a pill. The infusion can be done in a doctor's office, chemotherapy clinic, or in a hospital setting.

Often, a slightly larger and sturdier IV is required in the vein system to give chemo. They are known as [central venous catheters](#)<sup>1</sup> (CVCs), central venous access devices (CVADs), or central lines. They are used to put medicines, blood products, nutrients, or fluids right into your blood. They can also be used to take out blood for testing.

Doctors give chemo in cycles, with each period of treatment followed by a rest period to give you time to recover from the effects of the drugs. Cycles are most often 2 or 3 weeks long. The schedule varies depending on the drugs used. For example, with some drugs, the chemo is given only on the first day of the cycle. With others, it is given for a few days in a row, or once a week. Then, at the end of the cycle, the chemo schedule repeats to start the next cycle.

Adjuvant and neoadjuvant chemo is often given for a total of 3 to 6 months, depending on the drugs used. The length of treatment for advanced pancreatic cancer is based on how well it is working and what side effects you may have.

## Possible side effects

Chemo drugs can cause side effects. These depend on the type and dose of drugs given and how long treatment lasts. Common possible side effects include:

- Nausea and vomiting
- Loss of appetite
- Hair loss
- Mouth sores
- Diarrhea or constipation

Chemo can also affect the blood-forming cells of the bone marrow, which can lead to:

- Increased chance of infection (from low white blood cells)
- Bleeding or bruising (from low platelet counts)
- Fatigue or shortness of breath (from low red blood cells)

These side effects usually go away after treatment is finished. There are often ways to lessen these side effects. For example, drugs can be given to help prevent or reduce nausea and vomiting.

Some chemo drugs can cause other side effects. For example:

- Drugs such as cisplatin, oxaliplatin, and paclitaxel can damage nerves, which can lead to symptoms of numbness, tingling, or even pain in the hands and feet (called peripheral neuropathy). For a day or so after treatment, oxaliplatin can cause nerve pain that gets worse with exposure to cold, including when swallowing cold foods or liquids.
- Cisplatin can damage the kidneys. Doctors try to prevent this by giving the patient lots of intravenous (IV) fluid before and after the drug is given.
- Cisplatin can affect hearing. Your doctor may ask if you have any ringing in the ears or hearing loss during treatment.

## More information about chemotherapy

For more general information about how chemotherapy is used to treat cancer, see [Chemotherapy<sup>2</sup>](#).

To learn about some of the side effects listed here and how to manage them, see



## Managing Cancer-related Side Effects<sup>3</sup>

### Hyperlinks

1. <https://www.cancer.org/treatment/treatments-and-side-effects/central-venous-catheters.html>
2. [www.cancer.org/treatment/treatments-and-side-effects/treatment-types/chemotherapy.html](http://www.cancer.org/treatment/treatments-and-side-effects/treatment-types/chemotherapy.html)
3. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html)

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## Targeted Therapy for Pancreatic Cancer

As researchers have learned more about the changes in pancreatic cancer cells that help them grow, they have developed newer drugs to specifically target these changes. These targeted drugs work differently from standard chemo drugs. Sometimes they work when standard chemo drugs don't, and they often have different side effects. (See [What's New in Pancreatic Cancer Research?](#)<sup>1</sup> for more information.)

**Erlotinib (Tarceva)** is a drug that targets a protein on cancer cells called *EGFR*, which normally helps the cells grow. In people with advanced pancreatic cancer, this drug can be given along with the chemo drug gemcitabine. Some people may benefit more from this combination than others. Common side effects of erlotinib include an acne-like rash on the face and neck, diarrhea, loss of appetite, and feeling tired.

### More information about targeted therapy

To learn more about how targeted drugs are used to treat cancer, see [Targeted Cancer Therapy](#)<sup>2</sup>.

To learn about some of the side effects listed here and how to manage them, see [Managing Cancer-related Side Effects](#)<sup>3</sup>.

### Hyperlinks

1. [www.cancer.org/cancer/pancreatic-cancer/about/new-research.html](http://www.cancer.org/cancer/pancreatic-cancer/about/new-research.html)
2. [www.cancer.org/treatment/treatments-and-side-effects/treatment-types/targeted-therapy.html](http://www.cancer.org/treatment/treatments-and-side-effects/treatment-types/targeted-therapy.html)
3. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html)

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## Immunotherapy for Pancreatic Cancer

Immunotherapy is the use of medicines to stimulate a person's own immune system to recognize and destroy cancer cells more effectively. Certain types of immunotherapy can be used to treat pancreatic cancer.

### Immune checkpoint inhibitors

An important part of the immune system is its ability to keep itself from attacking the body's normal cells. To do this, it uses “checkpoint” proteins on immune cells, which act like switches that need to be turned on (or off) to start an immune response. Cancer cells sometimes use these checkpoints to keep the immune system from attacking them. But drugs that target these checkpoints hold a lot of promise as cancer treatments.

Drugs called **checkpoint inhibitors** can be used for people whose pancreatic cancer cells have tested positive for specific gene changes, such as a high level of *microsatellite instability (MSI-H)*, or changes in one of the *mismatch repair (MMR)* genes. Changes in MSI or in MMR genes (or both) are often seen in people with [Lynch syndrome](#)<sup>1</sup>.

The drugs are used for people whose cancer starts growing again after chemotherapy. They might also be used to treat people whose cancer can't be removed with surgery, has come back (recurred) after treatment, or has spread to other parts of the body (metastasized).

## PD-1 inhibitor

**Pembrolizumab (Keytruda)** is a drug that targets PD-1, a checkpoint protein on immune system cells called *T cells*, that normally helps keep these cells from attacking normal cells in the body. By blocking PD-1, this drug boosts the immune response against pancreatic cancer cells and can often shrink tumors.

This drug is given as an intravenous (IV) infusion every 2 or 3 weeks.

Side effects can include fatigue, cough, nausea, itching, skin rash, decreased appetite, constipation, joint pain, and diarrhea.

Other, more serious side effects occur less often. This drug works by basically removing the brakes from the body's immune system. Sometimes the immune system starts attacking other parts of the body, which can cause serious or even life-threatening problems in the lungs, intestines, liver, hormone-making glands, kidneys, or other organs.

It's very important to report any new side effects to your health care team promptly. If serious side effects do occur, treatment may need to be stopped and you may get high doses of corticosteroids to suppress your immune system.

## More information about immunotherapy

To learn more about how drugs that work on the immune system are used to treat cancer, see [Cancer Immunotherapy<sup>2</sup>](#).

To learn about some of the side effects listed here and how to manage them, see [Managing Cancer-related Side Effects<sup>3</sup>](#).

## Hyperlinks

1. [www.cancer.org/cancer/cancer-causes/genetics/family-cancer-syndromes.html](http://www.cancer.org/cancer/cancer-causes/genetics/family-cancer-syndromes.html)
2. [www.cancer.org/treatment/treatments-and-side-effects/treatment-types/immunotherapy.html](http://www.cancer.org/treatment/treatments-and-side-effects/treatment-types/immunotherapy.html)
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## Pain Control for Pancreatic Cancer

Pain can be a major problem for people with pancreatic cancer. These cancers can invade and press on nerves near the pancreas, which can cause pain in the abdomen (belly) or back.

Treatment is available to help relieve this pain. If you are having any pain, please be sure to tell your doctor or nurse. Pain is easier to control if the treatment is started when you first have it. You and your doctor or nurse can talk about the best ways to treat your pain. A pain specialist can also help develop a treatment plan.

Some proven ways to relieve pain from pancreatic cancer include:

### Pain medicines

For most patients, morphine or similar drugs (opioids) can help control the pain. Many people are worried about these drugs because they fear becoming addicted, but studies have shown that the risk of this is low if the patient takes the drug for pain as directed by the doctor.

Pain medicines work best when they are taken on a regular schedule. They do not work as well if they are only used when the pain becomes severe. Several long-acting forms of morphine and other opioids are in pill form and only need be taken once or twice a day. There is even a long-acting form of the drug fentanyl that is applied as a patch every 3 days.

Common side effects of these drugs are nausea and feeling sleepy, which often get

better over time. Constipation is a common side effect that does not get better on its own, so it needs to be treated. Most people need to take stool softeners and/or laxatives daily.

## Other treatments

Sometimes certain procedures might be needed to treat pain. For example, cutting or injecting alcohol into some of the nerves (that carry pain sensations) near the pancreas can often improve pain and may allow you to use lower doses of pain medicines. If you are having [surgery](#) for some reason (such as to remove the cancer or relieve bile duct blockage), this can usually be done as part of the same operation.

This can also be done as a separate procedure. The doctor might do a nerve block by injecting the nerves near the pancreas with either an anesthetic or a medicine that destroys the nerves.

This can be done with the help of an ultrasound or CT scan either by:

- passing a needle through the skin or
- by using an [endoscope](#)<sup>1</sup> (a long, flexible tube that is passed down the throat and past the stomach) that guides a needle to the nerves.

Treating the cancer with [chemotherapy](#) and/or [radiation therapy](#) can also sometimes relieve pain by shrinking the size of the cancer.

For more information on pain and what can be done about it, see [Cancer Pain](#)<sup>2</sup>.

## Hyperlinks

1. [www.cancer.org/treatment/understanding-your-diagnosis/tests/endoscopy/upper-endoscopy.html](http://www.cancer.org/treatment/understanding-your-diagnosis/tests/endoscopy/upper-endoscopy.html)
2. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/pain.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/pain.html)

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## Treating Pancreatic Cancer, Based on Extent of the Cancer

Most of the time, pancreatic cancer is treated based on its [stage](#)<sup>1</sup> – how far it has spread in the body. But other factors, such as your overall health, can also affect treatment options. Talk to your doctor if you have any questions about the treatment plan he or she recommends.

It can be hard to stage pancreatic cancer accurately using [imaging tests](#)<sup>2</sup>. Doctors do their best to figure out before treatment if there is a good chance the cancer is resectable – that is, if it can be removed completely. But sometimes cancers turn out to have spread farther than was first thought.

*This information is about treating exocrine pancreatic cancer, the most common type of pancreatic cancer. See [Pancreatic Neuroendocrine Tumor \(NET\)](#)<sup>3</sup> for information about how that type is typically treated.*

### Treating resectable cancer

Surgeons usually consider pancreatic cancer to be resectable if it looks like it is still just in the pancreas or doesn't extend far beyond the pancreas, and has not grown into

nearby large blood vessels. A person must also be healthy enough to withstand surgery to remove the cancer, which is a major operation.

If imaging tests show a reasonable chance of removing the cancer completely, [surgery](#) is the preferred treatment if possible, as it offers the only realistic chance for cure. Based on where the cancer started, usually either a Whipple procedure (pancreaticoduodenectomy) or a distal pancreatectomy is used.

Sometimes even when a cancer is thought to be resectable, it becomes clear during the surgery that not all of it can be removed. If this happens, continuing the operation might do more harm than good. The surgery might be stopped, or the surgeon might continue with a smaller operation with a goal of relieving or preventing problems such as bile duct blockage.

### **Adjuvant treatment (treatment after surgery)**

Even when the surgeon thinks all of the cancer has been removed, the cancer might still come back. Giving [chemotherapy](#) (chemo), either alone or with [radiation therapy](#) (chemoradiation), *after* surgery (known as **adjuvant treatment**) might help some patients live longer. The chemo drugs most often used are gemcitabine (Gemzar) or 5-FU.

### **Neoadjuvant treatment (treatment before surgery)**

Sometimes, if the tumor is thought to be resectable but is very large, has many nearby large lymph nodes, or is causing significant pain, chemotherapy or chemoradiation may be given *before* surgery to shrink the tumor (known as **neoadjuvant treatment**). This may make it easier to remove all the cancer at the time of surgery. Additional chemo may still be recommended after surgery.

### **Treating borderline resectable cancer**

A small number of pancreatic cancers have reached nearby blood vessels but have not grown deeply into them or surrounded them. These cancers might still be removable by surgery, but the odds of removing all of the cancer are lower, so they are considered *borderline resectable*.

These cancers are often treated first with neoadjuvant [chemotherapy](#) (sometimes along with [radiation therapy](#)) to try to shrink the cancer and make it easier to remove. [Imaging tests](#)<sup>4</sup> (and sometimes laparoscopy) are then done to make sure the cancer hasn't grown too much to be removed. As long as it hasn't, surgery is then done to remove it.



This might be followed by more chemotherapy.

Another option might be to have surgery first, followed by adjuvant chemotherapy (and possibly radiation). If, during the surgery, it becomes clear that not all of the cancer can be removed, continuing the operation might do more harm than good. The surgery might be stopped, or the surgeon might continue with a smaller operation with a goal of relieving or preventing problems such as bile duct blockage.

## Treating locally advanced (unresectable) cancer

Locally advanced cancers have grown too far into nearby blood vessels or other tissues to be removed completely by surgery, but have not spread to the liver or distant organs and tissues. Surgery to try to remove these cancers does not help people live longer. Therefore, if surgery is done, it is to relieve bile duct blockage or to bypass a blocked intestine caused by the cancer pressing on other organs.

[Chemotherapy](#), sometimes followed by chemoradiation, is the standard treatment option for locally advanced cancers. This may help some people live longer even if the cancer doesn't shrink. Giving chemo and [radiation therapy](#) together may work better to shrink the cancer, but this combination has more side effects and can be harder on patients than either treatment alone. Sometimes, [targeted therapy](#) may be added to chemotherapy before chemoradiation is given.

Other times, [immunotherapy](#) given alone may also be an option.

Surgery might be done after chemo or chemoradiation, if imaging shows the cancer has become smaller and can be removed completely by surgery.

## Treating metastatic (widespread) cancer

Pancreatic cancers often first spread within the abdomen (belly) and to the liver. They can also spread to the lungs, bone, brain, and other organs.

These cancers have spread too much to be removed by surgery. Even when imaging tests show that the spread is only to one other part of the body, it is often assumed that small groups of cancer cells (too small to be seen on imaging tests) have already reached other organs of the body.

[Chemotherapy](#) is the main treatment for these cancers. It can sometimes shrink or slow the growth of these cancers for a time and might help people live longer, but it is not expected to cure the cancer.

Gemcitabine is the drug used most often. It can be used alone (especially for people in poor health), or it can be combined with other drugs like albumin-bound paclitaxel (Abraxane), the [targeted drug](#) erlotinib (Tarceva), or capecitabine (Xeloda).

Another option, especially for people who are otherwise in good health, is a combination of chemo drugs called FOLFIRINOX. This consists of 4 drugs: 5-FU, leucovorin, irinotecan (Camptosar), and oxaliplatin (Eloxatin). This treatment might help people live longer than getting gemcitabine alone, but it can also have more severe side effects. In certain cases, [immunotherapy](#) may also be a choice for people who are healthy enough to get it.

Other treatments might also be used to help prevent or relieve symptoms from these cancers. For example, [radiation therapy](#) or some type of [nerve block](#) might be used to help relieve cancer pain, or a [stent](#) might be placed during an endoscopy to help keep the bile duct open.

Because the treatments now available don't work well for many people, you may want to think about taking part in a [clinical trial](#)<sup>5</sup> of new drugs or combinations of drugs.

## Treating pancreatic cancer that progresses or recurs

If cancer continues to grow during treatment (progresses) or comes back (recurs), your treatment options will depend on:

- Where and how much the cancer has spread
- What treatments you have already had
- Your health and desire for more treatment.

It's important that you understand the goal of any further treatment, as well as the likelihood of benefits and risks.

When pancreatic cancer recurs, it most often shows up first in the liver, but it may also spread to the lungs, bone, or other organs. This is usually treated with [chemotherapy](#) if you are healthy enough to get it. If you have had chemo before and it kept the cancer away for some time, the same chemo might be helpful again. Otherwise, different chemo drugs might be tried, sometimes along with [targeted therapy](#). [Immunotherapy](#) may also be helpful in some cases of recurrent pancreatic cancer. Other treatments such as [radiation therapy](#) or [stent placement](#) might be used to help prevent or relieve symptoms from the cancer.

If the cancer progresses while you are getting chemotherapy, another type of

chemotherapy might be tried if you are healthy enough.

At some point, it might become clear that standard treatments are no longer controlling the cancer. If you want to continue getting treatment, you might think about taking part in a [clinical trial](#)<sup>6</sup> of a newer pancreatic cancer treatment. While these are not always the best option for every person, they may benefit you, as well as future patients.

## Treating cancer of the ampulla of Vater

The ampulla of Vater is the area where the pancreatic duct and the common bile duct empty into the duodenum (the first part of the small intestine). Cancer at this site (known as *ampullary cancer*) can start in the pancreatic duct, the duodenum, or the common bile duct. In many patients, ampullary cancer can't be distinguished from pancreatic cancer until surgery has been done.

These cancers often cause early symptoms such as jaundice, so they are often found while they are still resectable. [Surgery](#) with the Whipple procedure is often successful in treating these early stage cancers. Adjuvant chemoradiotherapy is often recommended after surgery.

More advanced ampullary cancers are treated like pancreatic cancer.

## Hyperlinks

1. [www.cancer.org/cancer/pancreatic-cancer/detection-diagnosis-staging/staging.html](http://www.cancer.org/cancer/pancreatic-cancer/detection-diagnosis-staging/staging.html)
2. [www.cancer.org/cancer/pancreatic-cancer/detection-diagnosis-staging/how-diagnosed.html](http://www.cancer.org/cancer/pancreatic-cancer/detection-diagnosis-staging/how-diagnosed.html)
3. [www.cancer.org/cancer/pancreatic-neuroendocrine-tumor.html](http://www.cancer.org/cancer/pancreatic-neuroendocrine-tumor.html)
4. [www.cancer.org/cancer/pancreatic-cancer/detection-diagnosis-staging/how-diagnosed.html](http://www.cancer.org/cancer/pancreatic-cancer/detection-diagnosis-staging/how-diagnosed.html)
5. [www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html](http://www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html)
6. [www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html](http://www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html)

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# After Pancreatic Cancer Treatment

## Living as a Cancer Survivor

For many people, cancer treatment often raises questions about next steps as a survivor.

- [Living as a Pancreatic Cancer Survivor](#)

## Cancer Concerns After Treatment

Treatment may remove or destroy the cancer, but it's very common to worry about the risk of developing another cancer.

- [Second Cancers After Pancreatic Cancer](#)

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# Living as a Pancreatic Cancer Survivor

For some people with pancreatic cancer, treatment can remove or destroy the cancer. Completing treatment can be both stressful and exciting. You may be relieved to finish treatment, but find it hard not to worry about cancer coming back. This is very common if you've had cancer.

For many people with pancreatic cancer, the cancer might never go away completely, or it might come back in another part of the body. These people may get regular treatments with chemotherapy, radiation therapy, or other therapies to help keep the

cancer under control for as long as possible. Learning to live with cancer that does not go away can be difficult and very stressful.

## Follow-up care

If you have completed treatment, your doctors will still want to watch you closely. It's very important to go to all of your follow-up appointments. During these visits, your doctors will ask questions about any problems you are having and may do exams and lab or imaging tests to look for signs of cancer or treatment side effects.

Some treatment side effects might last a long time or might not even show up until years after you have finished treatment. Your doctor visits are a good time to ask questions and talk about any changes or problems you notice or concerns you have.

It's important for all pancreatic cancer survivors, to let their health care team know about any new symptoms or problems, because they could be caused by the cancer [coming back](#)<sup>1</sup> or by a new disease or second cancer.

## Doctor visits and tests

Your schedule of doctor visits, exams, and tests will depend on the original extent of your cancer, how it was treated, and other factors. Most often, for people with no signs of cancer remaining, many doctors recommend follow-up visits (which may include CT scans and blood tests) about every 3 months for the first couple of years after treatment and then about every 6 months for the next several years. Be sure to follow your doctor's advice about follow-up tests.

## Ask your doctor for a survivorship care plan

Talk with your doctor about developing a survivorship care plan for you. This plan might include:

- A suggested schedule for follow-up exams and tests
- A list of possible late- or long-term side effects from your treatment, including what to watch for and when you should contact your doctor
- A schedule for other tests you might need, such as tests to look for long-term health effects from your cancer or its treatment
- Suggestions for things you can do that might improve your health, including possibly lowering your chances of the cancer coming back

## Keeping health insurance and copies of your medical records

Even if you've finished treatment, it's very important to keep [health insurance](#)<sup>2</sup>. Tests and doctor visits cost a lot, and even though no one wants to think of their cancer coming back, this could happen.

At some point after your cancer treatment, you might find yourself seeing a new doctor who doesn't know about your medical history. It's important to keep copies of your medical records to give your new doctor the details of your diagnosis and treatment. Learn more in [Keeping Copies of Important Medical Records](#)<sup>3</sup>.

## Help with nutrition and pain

Pancreatic cancer often causes weight loss and weakness from poor nutrition. These symptoms might be caused by treatment or by the cancer itself. A team of doctors and nutritionists can work with you to provide nutritional supplements and information about your individual nutritional needs. This can help you keep up your weight and nutritional intake. Many patients need to take pancreatic enzymes in pill form to help digest food so that it can be absorbed. For serious nutrition problems, the doctor might need to put a feeding tube into the stomach to improve nutrition and energy levels. This is usually temporary. For more information and nutrition tips for during and after cancer treatment, see [Nutrition for the Person With Cancer During Treatment](#)<sup>4</sup>.

There are many [ways to control pain caused by pancreatic cancer](#)<sup>5</sup>. If you have pain, tell your cancer care team right away, so they can give you prompt and effective pain management.

## Can I lower the risk of my cancer progressing or coming back?

If you have (or have had) pancreatic cancer, you probably want to know if there are things you can do that might lower your risk of the cancer growing or coming back, such as exercising, eating a certain type of diet, or taking nutritional supplements. Unfortunately, it's not yet clear if there are things you can do that will help.

Tobacco use has clearly been linked to pancreatic cancer, so not smoking may help reduce your risk. We don't know for certain if this will help, but we do know that it can help improve your appetite and overall health. It can also reduce the chance of developing other types of cancer. If you want to [quit smoking](#)<sup>6</sup> and need help, call the American Cancer Society at 1-800-227-2345.

Other healthy behaviors such as [eating well, getting regular physical activity](#)<sup>7</sup>, and



[staying at a healthy weight](#)<sup>8</sup> might help as well, but no one knows for sure. However, we do know that these types of changes can have positive effects on your health that can extend beyond your risk of cancer.

### **About dietary supplements**

So far, no [dietary supplements](#)<sup>9</sup> (including vitamins, minerals, and herbal products) have been shown to clearly help lower the risk of pancreatic cancer progressing or coming back. This doesn't mean that no supplements will help, but it's important to know that none have been proven to do so.

Dietary supplements are not regulated like medicines in the United States – they do not have to be proven effective (or even safe) before being sold, although there are limits on what they're allowed to claim they can do. If you're thinking about taking any type of nutritional supplement, talk to your health care team. They can help you decide which ones you can use safely while avoiding those that might be harmful.

### **If the cancer comes back**

If your cancer does come back at some point, your treatment options will depend on the where the cancer is, what treatments you've had before, and your health. Treatment options might include surgery, radiation therapy, chemotherapy, or some combination of these. See [Treatment of Pancreatic Cancer, Based on Extent of the Cancer](#)<sup>10</sup>.

For more general information on recurrence, see [Understanding Recurrence](#)<sup>11</sup>.

### **Second cancers after treatment**

People who've had pancreatic cancer can still get other cancers. Learn more in [Second Cancers After Pancreatic Cancer](#).

### **Getting emotional support**

Some amount of feeling [depressed, anxious, or worried](#)<sup>12</sup> is normal when pancreatic cancer is a part of your life. Some people are affected more than others. But everyone can benefit from help and support from other people, whether friends and family, religious groups, support groups, professional counselors, or others. Learn more in [Life After Cancer](#)<sup>13</sup>.

### **Hyperlinks**

1. [www.cancer.org/treatment/survivorship-during-and-after-treatment/understanding-recurrence.html](http://www.cancer.org/treatment/survivorship-during-and-after-treatment/understanding-recurrence.html)
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## Second Cancers After Pancreatic Cancer

Pancreatic cancer survivors can be affected by a number of health problems, but often a major concern is facing cancer again. Cancer that comes back after treatment is called a *recurrence*. But some cancer survivors develop a new, unrelated cancer later. This is called a *second cancer*.

Unfortunately, being treated for pancreatic cancer doesn't mean you can't get another cancer. People who have had pancreatic cancer can still get the same types of cancers that other people get. In fact, they might be at higher risk for certain types of cancer.

Studies looking at the second cancers pancreatic cancer survivors can get are not easy to do, mainly because of the poor outcomes related to pancreatic cancer. The little information that is known shows that there is an increased risk of:

- [Thyroid cancer](#)<sup>1</sup>
- [Small Intestine Cancer](#)<sup>2</sup>

For people diagnosed with pancreatic cancer younger than 50 years of age, there appears to be an increased risk of [lung cancer](#)<sup>3</sup>. This is believed to be related to smoking.

Exactly how high the risk is of these second cancers is not known at this time.

### Follow-up after pancreatic cancer treatment

After completing treatment, you should still see your doctor regularly. Report any new symptoms or problems, because they could be caused by the cancer spreading or coming back, or by a new disease or second cancer.

Pancreatic cancer survivors should also follow the [American Cancer Society guidelines for the early detection of cancer](#)<sup>4</sup>, such as those for colorectal, breast, cervical, and prostate cancer. Screening tests can find some cancers early, when they are likely to be treated more successfully. For people who have had pancreatic cancer, most experts don't recommend any additional testing to look for second cancers unless you have symptoms or if you or your family have an [inherited genetic syndrome](#)<sup>5</sup>.

## Can I lower my risk of getting a second cancer?

There are steps you can take to lower your risk and stay as healthy as possible. For example, people who have had pancreatic cancer should do their best to [stay away from tobacco products](#)<sup>6</sup>. Not smoking lowers the chance of developing most lung cancers, and may help decrease the possibility of a new pancreatic cancer from forming.

To help maintain good health, pancreatic cancer survivors should also:

- Try to get to and stay at a [healthy weight](#)<sup>7</sup>
- Stay [physically active](#)<sup>8</sup>
- Eat a [healthy diet](#)<sup>9</sup>, with an emphasis on plant foods
- Limit [alcohol](#)<sup>10</sup> to no more than 1 drink per day for women or 2 per day for men

These steps may also lower the risk of some other health problems.

See [Second Cancers in Adults](#)<sup>11</sup> for more information about causes of second cancers.

## Hyperlinks

1. [www.cancer.org/cancer/thyroid-cancer.html](http://www.cancer.org/cancer/thyroid-cancer.html)
2. [www.cancer.org/cancer/small-intestine-cancer.html](http://www.cancer.org/cancer/small-intestine-cancer.html)
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