



NCCN  
GUIDELINES  
FOR PATIENTS®

2025

# Pancreatic Cancer



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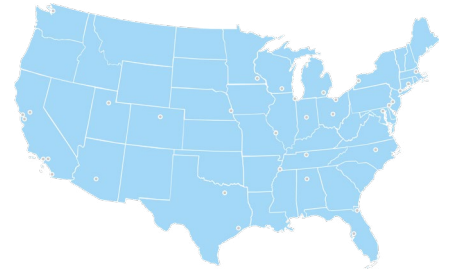


# About the NCCN Guidelines for Patients®



National Comprehensive  
Cancer Network®

Did you know that top cancer centers across the United States work together to improve cancer care? This alliance of leading cancer centers is called the National Comprehensive Cancer Network® (NCCN®).



Cancer care is always changing. NCCN develops evidence-based cancer care recommendations used by health care providers worldwide. These frequently updated recommendations are the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®). The NCCN Guidelines for Patients plainly explain these expert recommendations for people with cancer and caregivers.

**These NCCN Guidelines for Patients are based on the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Pancreatic Adenocarcinoma, Version 2.2025 — February 3, 2025.**

Learn how the NCCN Guidelines for Patients are developed

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In memory of Eric Werner



The Hirshberg Foundation for Pancreatic Cancer Research is focused on finding a cure for pancreatic cancer, and empowering the patients and families whose lives are touched by this disease. Founded in 1997, the foundation funds groundbreaking scientific research, provides patient education and support, and sustains hope that this cancer will be eradicated once and for all. [pancreatic.org](https://pancreatic.org)

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## Contents

4	About pancreatic cancer
8	Testing for pancreatic cancer
18	Types of treatment
26	Supportive care for cancer complications
33	Planning primary treatment
36	Systemic therapy for primary treatment
48	Surgery for primary treatment
58	Other resources
62	Words to know
65	NCCN Contributors
66	NCCN Cancer Centers
68	Index

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National Comprehensive Cancer Network (NCCN) and NCCN Foundation  
3025 Chemical Road, Suite 100, Plymouth Meeting, PA 19462 USA

# 1

## About pancreatic cancer

- 5 What is pancreatic cancer?
- 5 What are the types of pancreatic cancer?
- 6 How is pancreatic cancer found?
- 6 What causes pancreatic cancer?
- 6 How is pancreatic cancer treated?
- 7 What can you do to get the best care?

**Pancreatic cancer is a challenging cancer to treat, but treatments are improving. This book provides the latest information on testing, staging, and treatment to help you make informed decisions with your care team. First, it's important to know what exactly pancreatic cancer is.**

The pancreas is part of the digestive system, and it makes enzymes that help digest food. It also makes hormones that control blood sugar levels.

A mass called a tumor forms when pancreatic cancer cells multiply out of control. The tumor can grow through the wall of the pancreas and into nearby body tissue. Cancer cells can also break away from the tumor, spread to other areas, and form more tumors.

## What are the types of pancreatic cancer?

The main types of pancreatic cancers are pancreatic adenocarcinomas and neuroendocrine tumors.

Pancreatic adenocarcinomas are the more common type of pancreatic cancer and are the focus of this book. These cancers form from

## What is pancreatic cancer?

Pancreatic cancer is a disease that causes uncontrolled growth of cells in a large gland called the pancreas.

### Pancreas

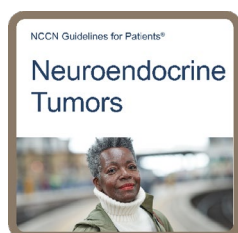
**Sounds like PAN-kree-us.**

**The pancreas is deep inside the body. It sits just below the liver and behind the stomach. In adults, the pancreas is about 6 inches long, which is about the size of a US dollar bill.**



exocrine cells, which make enzymes that help digest food.

Less often, pancreatic cancer forms from hormone-making endocrine cells. These cancers are called neuroendocrine tumors. Information on pancreatic neuroendocrine tumors can be found in *NCCN Guidelines for Patients: Neuroendocrine Tumors*, available at [NCCN.org/patientguidelines](https://www.nccn.org/patientguidelines) and on the [NCCN Patient Guides for Cancer](#) app.



## How is pancreatic cancer found?

Imaging scans are used to look for pancreatic cancer and assess where the cancer has spread. Pancreatic cancer can be difficult to see on scans. That's why your care team will request a very specific imaging method for pancreatic cancer. More information on imaging is in *Chapter 2: Testing for pancreatic cancer*.

## What causes pancreatic cancer?

Experts don't know exactly what causes pancreatic cancer, but they know that there are several risk factors for pancreatic cancer. One of these is being born with inherited genes that carry a risk for the cancer.

However, an inherited risk for pancreatic cancer is not common. About 1 in 10 people with pancreatic cancer have an inherited risk. In these cases, the cancer is called hereditary pancreatic cancer. Tests that detect the genes linked to pancreatic cancer are also discussed in *Chapter 2*.

## How is pancreatic cancer treated?

There's no single treatment for pancreatic cancer that's best for everyone. But a team of experts from different fields of medicine will work together to decide the best treatment for you. This book has several chapters that will walk you through the process of treatment planning.

Before cancer treatment starts, you may need help with challenges brought on by cancer. This help is called supportive care. Supportive care addresses many issues, including paying bills and managing symptoms like pain. To learn about treatments for common health issues caused by pancreatic cancer, read *Chapter 4: Supportive care for cancer complications*.

Planning cancer treatment starts with figuring out if you will receive surgery to remove the cancer from your body. Surgery is the only treatment that might cure pancreatic cancer, but it's not the best option for most people. Some of the factors your care team will consider when planning treatment for you are discussed in *Chapter 5: Planning primary treatment*.



The most common treatment used to control cancer growth and reduce symptoms is drug treatment. The cancer drugs used to treat pancreatic cancer differ among people. Options for drug treatment based on your overall health are discussed in *Chapter 6: Systemic therapy for primary treatment*.

The types of pancreatic surgery and treatments used with surgery are described in *Chapter 7: Surgery for primary treatment*.

## What can you do to get the best care?

Advocate for yourself. You have an important role to play in your care. In fact, you're more likely to get the care you want by asking questions and making shared decisions with your care team.

The NCCN Guidelines for Patients will help you understand cancer care. With better understanding, you'll be more prepared to discuss your care with your team and share your concerns. Many people feel more satisfied when they play an active role in their care.

You may not know what to ask your care team. That's common. Each chapter in this book ends with an important section called Questions to ask. These suggested questions will help you get more information on all aspects of your care.

Take the next step and keep reading to learn what the best care for you!

### Why you should read this book

Making decisions about cancer care can be stressful. You may need to make tough decisions under pressure about complex choices.

The NCCN Guidelines for Patients are trusted by patients and providers. They clearly explain current care recommendations made by respected experts in the field. Recommendations are based on the latest research and practices at leading cancer centers.

Cancer care is not the same for everyone. By following expert recommendations for your situation, you are more likely to improve your care and have better outcomes as a result. Use this book as your guide to find the information you need to make important decisions.

# 2

## Testing for pancreatic cancer

- 9 Reasons to suspect pancreatic cancer
- 9 Decisions by a multidisciplinary team
- 11 Imaging of the pancreas
- 12 Additional imaging
- 12 Endoscopic tests
- 13 Blood tests
- 14 Biopsy to confirm cancer
- 15 Genetic tests for inherited mutations
- 16 Biomarker tests for tumor profiling
- 16 What's next?
- 17 Key points
- 17 Questions to ask

**A series of tests is needed to identify pancreatic cancer and plan treatment. Imaging is key to detect where cancer is in the body. Testing can also show if the cancer has unique features for which there is specific treatment.**

## Reasons to suspect pancreatic cancer

There is no tell-tale sign of pancreatic cancer, especially in early stages. Your health care provider may suspect pancreatic cancer based on symptoms. A common symptom of pancreatic cancer is yellowed skin or eyes

called jaundice. Signs of pancreatic cancer on imaging scans include wider-than-normal pancreatic ducts or an inflamed pancreas.

If your health care provider suspects you have pancreatic cancer, testing will be needed. Importantly, signs of pancreatic cancer can also be mistaken for symptoms caused by other health conditions.

## Decisions by a multidisciplinary team

Because pancreatic cancer is complex, it takes a team of experts to decide the best way to diagnose and treat pancreatic cancer.

This team of experts should be multidisciplinary—consisting of health care providers from different fields of medicine.

### Imaging

**Imaging is used to make pictures of the insides of your body. It's a very important for pancreatic cancer. It is used to find pancreatic cancer and assess if the cancer has spread from the pancreas to other organs.**



They should also work at a center that sees a lot of people with pancreatic cancer so that they are very experienced with pancreatic cancer.

Your team should have expertise in:

- Imaging, interventional endoscopy, and pathology
- Treating cancer with prescription drugs, radiation therapy, and surgery
- Specialty care of older adults who have less ability to carry out activities
- Genetic conditions

- Addressing symptoms of the cancer and symptoms of treatment

You are an important part of the team. Your input is just as important as tests for planning treatment.

When your care team meets to consult with one another, they will review your health records and the tests done prior to your visit.

You will likely have at least 1 imaging scan and some of the other tests listed in **Guide 1**.

### Guide 1 Tests for pancreatic cancer

#### Tests for diagnosis and staging

Imaging of the pancreas:

- Pancreatic protocol CT or MRI scan of the abdomen

Additional imaging if cancer spread is suspected:

- CT of the chest and pelvis
- MRI of the liver if needed
- PET/CT or PET/MRI if needed

Endoscopic tests:

- Endoscopic ultrasound, ERCP, or laparoscopy may be done for staging

Blood tests:

- Liver function tests and CA 19-9 marker

Needle biopsy to confirm there is cancer:

- Performed with endoscopic ultrasound or image-guided biopsy through the skin

#### Tests for personalized treatment

- Genetic tests for inherited mutations passed down from a parent
- Biomarker tests of cancer cells to obtain a molecular profile

# Imaging of the pancreas

Imaging takes pictures of the inside of the body, and can show cancer deep inside the body. A diagnostic radiologist is an expert in identifying health conditions in images. They will review your images for cancer.

Imaging of the pancreas is very important and is often the first test done for pancreatic cancer. It is used to detect and stage pancreatic cancer. A cancer stage describes how much cancer is in the body and where.

## Pancreatic protocols

Radiologists have identified which methods best show cancer in and near the pancreas. These methods are known as pancreatic protocols. There are pancreatic protocols for computed tomography (CT) and magnetic resonance imaging (MRI).

You'll receive liquid contrast before the imaging tests if it's safe for you to receive. Contrast makes the images clearer.

## CT scan

A CT scan is a more detailed kind of x-ray. It takes many pictures from different angles and a computer combines the images to make 3-D pictures. A pancreatic protocol CT takes pictures before contrast and multiple times after contrast.

## MRI scan

Imaging of the pancreas is most often done with a CT scan, but you may have an MRI instead. MRI uses strong magnetic fields and radio waves to make images. A pancreatic

## Stages of pancreatic cancer

The stages of pancreatic cancer range from stage 0 to stage 4. Often, stages 1 through 4 are written with Roman numerals—stages I, II, III, and IV. :

- ♦ Stage 0 pancreatic cancer is only in the innermost layer of a pancreatic duct.
- ♦ Stage 1 pancreatic cancer consists of a tumor that is 4 centimeters in size or smaller and has not spread outside the pancreas. This means the tumor is about the size of a golf ball or smaller.
- ♦ Stage 2 pancreatic cancer means the tumor is larger than 4 centimeters or the cancer has spread to 1 to 3 nearby lymph nodes. Lymph nodes are small structures that help the body fight disease.
- ♦ Stage 3 pancreatic cancer has grown through the pancreas to nearby major arteries or has spread to 4 or more lymph nodes.
- ♦ Stage 4 pancreatic cancer has spread far and commonly involves the liver, lungs, or lining of the abdomen.

protocol MRI may show small tumors and metastases that are not seen on a CT scan. A metastasis is pancreatic cancer that has spread from the pancreas to other organs.

A magnetic resonance cholangiopancreatography (MRCP) is a type of MRI that is usually part of the MRI pancreatic protocol. It makes very clear pictures of the pancreas and bile ducts. No contrast is used because bile and other fluids act as contrast.

### Additional imaging

Pancreatic cancer has often spread far by the time cancer is diagnosed. If the pancreatic protocol did not show distant metastases, you may undergo more imaging to see if the cancer has spread. This imaging includes:

- CT scan with contrast of the chest and pelvis
- MRI to look for cancer spread to the liver if the CT scan is unclear

- Positron emission tomography with CT (PET/CT) or with MRI (PET/MRI) if there is a high risk of metastases or other scans were unclear

A PET scan highlights tissue in your body that may be cancerous using a sugar radiotracer. Cancer cells take in more of the tracer than normal cells and show up as bright spots on the scan.

### Endoscopic tests

An endoscope is a small medical device that allows doctors to see and work inside the body. It causes less trauma to the body than open surgery. Your care team will decide if endoscopic staging is needed, though this is not commonly done.

#### Endoscopic ultrasound

For some people, an endoscopic ultrasound may help stage pancreatic cancer. It can show where the tumor has grown in and around the pancreas.





### Endoscopic ultrasound

An endoscopic ultrasound may be done to confirm where the pancreatic tumor has grown. Part of the endoscope will be inserted into your mouth and guided down to the first part of the small intestine called the duodenum. The ultrasound probe on the endoscope makes images of the pancreas and nearby structures. Your doctor will look for areas of cancer growth and may obtain tissue samples for testing.

### ERCP

Endoscopic retrograde cholangiopancreatography (ERCP) is mostly used to treat health conditions. For example, this includes the placement of a stent to unblock a bile duct. ERCP may be used to look for areas of cancer growth. ERCP is very similar to an endoscopic ultrasound except it uses an injected dye to see tissue on x-rays.

### Laparoscopy

A laparoscopy may be done if your care team thinks you have metastatic cancer, but didn't see any signs of it with imaging. A surgeon performs a laparoscopy by making small cuts in the abdomen (belly). You'll be in a sleep-like state due to general anesthesia.

Endoscopes designed for laparoscopy are referred to as laparoscopes. Using a laparoscope, your surgeon will look for signs of cancer outside the pancreas. Tissue or fluid samples may be removed and tested for cancer.

## Blood tests

If metastatic cancer was not detected with imaging, 2 types of blood tests will be done to help with cancer staging. Blocked bile ducts can affect test results, so blood samples can only be drawn when your bile ducts are clear.

### Liver function tests

Liver function tests measure levels of proteins and enzymes made or processed by the liver. They also measure a chemical called bilirubin that makes bile yellow. Abnormal levels may be caused by pancreatic cancer that is blocking bile ducts or is in the liver.

### CA 19-9 marker

Pancreatic cancer cells make a protein called carbohydrate antigen 19-9 (CA 19-9). High CA 19-9 levels in the blood are a tumor marker of pancreatic cancer, but CA 19-9 can't be used alone for diagnosis for 2 reasons:

- High levels can be caused by other health conditions, including a blocked bile duct, and by certain medicines.
- Some people with pancreatic cancer have normal levels of CA 19-9 or no CA 19-9.

When caused by pancreatic cancer, high CA 19-9 levels often mean a high cancer stage. Your care team will take CA 19-9 levels into account when planning treatment. This test may be repeated after treatment to check if levels are dropping or rising.

If your CA 19-9 levels are normal, your care team may check your carcinoembryonic antigen (CEA) level. CEA is a protein in blood.

It is often high in people who have pancreatic cancer.

### Biopsy to confirm cancer

A biopsy is a procedure that removes tissue or fluid samples from the body. The samples are then sent to a lab and examined by a pathologist for cancer cells. A pathologist is an expert in testing cells and tissue to diagnose disease, including cancer.

Testing biopsy samples is the only way to confirm if you have pancreatic cancer. NCCN doesn't recommend testing circulating tumor DNA in blood because there's no strong data to support its use in pancreatic cancer.

#### Timing of biopsy

Not everyone needs a biopsy before treatment. If you have surgery first, the diagnosis may be confirmed on the day of surgery to spare you from having another complex procedure. If you don't have surgery, a biopsy is needed to confirm the diagnosis before drug treatment, such as chemotherapy.

#### Types of biopsy

The type of biopsy you'll receive partly depends on where the cancer may be and on the treatment plan. The body part that likely has cancer and would provide the highest cancer stage will be sampled. Several samples should be removed for diagnosis as well as biomarker testing.

A biopsy for pancreatic cancer is often done with a needle. This is called a needle biopsy.

The preferred method of performing a needle biopsy is with an endoscopic ultrasound. This method obtains better samples and has less serious risks than other biopsies. If you get an ERCP, the biopsy can be done before the stent is placed.

Another method of performing a needle biopsy is to go through the skin. This method is usually done if your team suspects that pancreatic cancer has spread to other organs. A CT scan or ultrasound will be used to guide the needle to the right spot. Imaging-guided biopsy is the preferred way to remove small pieces of tumor.

#### A second biopsy may be needed

If no cancer cells are found, a second biopsy may be done if your care team thinks you could have cancer. Tissue from another area may be removed or a different type of biopsy might be done. You might need to go to a cancer center that treats many people with pancreatic cancer.

“

**They tell me to take it a day at a time, dealing with pancreatic cancer, treatments, and side effects. It's more like a moment at a time. Ultimately those moments become days and then weeks. One day, you'll look back and recognize the challenges you've overcome and the milestones you've surpassed.”**



# Genetic tests for inherited mutations

Some people with pancreatic cancer inherited a risk for the cancer from a birth parent. In these cases, the cancer is called hereditary pancreatic cancer.

## Germline mutations

Cancer risk is passed down from parents to children through abnormal genes called germline mutations. Germline mutations are in every cell of the body that has DNA. Germline genetic testing tells your care team about you, but not necessarily about your cancer.

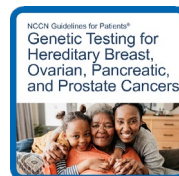
Genetic tests are used to look for germline mutations. All people with pancreatic cancer should get genetic tests, which are used for treatment planning. Either a sample of blood or spit is tested. Germline mutations related to pancreatic cancer are listed in **Guide 2**.

Genetic tests look for but won't find germline mutations in most people with pancreatic

**All people with pancreatic cancer should get genetic tests for inherited mutations.**

cancer. That's because most people don't have hereditary pancreatic cancer. Also, the genetic cause of hereditary pancreatic cancer is unknown in most families.

Read more about genetic testing in *NCCN Guidelines for Patients: Genetic Testing for Hereditary Breast, Ovarian, Pancreatic, and Prostate Cancers*, available at [NCCN.org/patientguidelines](https://www.nccn.org/patientguidelines) and on the [NCCN Patient Guides for Cancer](#) app.



## Genetic counseling

Talking to a genetic counselor may be helpful for people with pancreatic cancer who have either a:

- Cancer-causing germline mutation or
- Family history of cancer, especially pancreatic cancer.

Genetic counselors can help explain what the results of genetic tests mean. You may learn that you have a hereditary health condition. You and your counselor can discuss sharing your test results with your family.

### Guide 2 Inherited gene mutations that increase the risk for pancreatic cancer

*ATM* mutation

*BRCA1* and *BRCA2* mutations

*CDKN2A* mutation

*MLH1*, *MSH2*, *MSH6*, and *PMS2* mutations

*STK11* mutation

*TP53* mutation

Genetic testing for inherited mutations is helpful for planning treatment. Some types of treatment work well for certain inherited mutations. An example is the drug olaparib (Lynparza) which is used to treat people with pancreatic cancer who have germline *BRCA* mutations.

## Biomarker tests for tumor profiling

Biomarker tests look for biological clues, or markers, of cancer that differ between people. These clues, such as the CA 19-9 marker, can help with diagnosis and treatment.

Importantly, not all pancreatic cancers are the same. Biomarker tests for pancreatic

cancer provide a molecular profile—small yet important features—of the cancer. They detect abnormal changes in the genes of cancer cells that occurred during your lifetime. Some of these changes are listed in **Guide 3**.

At this time, molecular biomarker tests are done only if you have pancreatic cancers that will mainly be treated with cancer drugs. A sample of the tumor is preferred for testing. Since fragments of DNA from cancer cells are in the blood, a blood sample might be tested if tissue testing is not an option.

## What's next?

Your team will discuss your diagnosis with you and tell you if you need more tests. They will

### Guide 3

#### Biomarkers used to plan drug treatment of advanced pancreatic cancer

A **fusion** is a joining of a piece of gene to a piece of another gene. There are treatments for *ALK*, *NRG1*, *NTRK*, *ROS*, *FGFR2*, and *RET* fusions.

A **mutation** is a change in a gene's DNA. There are treatments for *BRAF* V600E, *BRCA1*, *BRCA2*, *PALB2*, and *KRAS* G12C mutations.

An **amplification** is extra copies of a gene. There is treatment for *HER2* amplification.

**Overexpression** is a high level of a cell protein. There is treatment for *HER2* overexpression.

**Microsatellite instability** is when errors are made in small DNA parts when DNA is being copied to make new cells. There is treatment for high microsatellite instability.

**Mismatch repair deficiency** is an inability to correct microsatellite instability due to an impaired repair system. There is treatment for mismatch repair deficiency.

**Tumor mutational burden** is the total number of DNA changes in cancer cells. There is treatment for high tumor mutational burden.

also start planning treatment using the test results.

The types of treatment used for pancreatic cancer are briefly described in the next chapter. This overview will help you understand later chapters that explain NCCN recommendations for planning treatment and personalized care.

### Key points

- A highly experienced team of experts should manage your care if pancreatic cancer is suspected or diagnosed.
- When pancreatic cancer is suspected, a CT or MRI scan done according to a pancreatic protocol can best show if there is a mass and where it has grown. Additional imaging and endoscopic tests may be done to help figure out the stage of your cancer.
- Liver function tests and a CA 19-9 test are needed for treatment planning.
- A diagnosis of pancreatic cancer can only be made by testing a sample of tissue.
- After diagnosis, genetic tests will be done to assess if you have an inherited risk of pancreatic cancer.
- Biomarker tests provide a molecular profile of the cancer that is used for treatment planning.

### Questions to ask

- Who will explain what's needed of me for testing?
- Could the tests be wrong or cause health problems?
- How long will it take for me to get the results of my tests?
- Who will explain my test results to me and when?
- How can I get a copy of the test results in case I want a second opinion?

# 3

## Types of treatment

- 19 Clinical trials
- 20 Chemotherapy
- 22 Targeted therapy
- 23 Immune checkpoint inhibitors
- 23 Surgery
- 24 Radiation therapy
- 25 Chemoradiation
- 25 What's next?
- 25 Key points
- 25 Questions to ask

**There are many treatments for pancreatic cancer. This chapter briefly describes all the treatments since many people receive more than one treatment. You'll learn how cancer treatments work and how to get early access to new treatments.**

## Clinical trials

You may be able to receive cutting-edge treatment for pancreatic cancer through a clinical trial.

A clinical trial is a type of medical research study. After being developed and tested in a lab, potential new ways of fighting cancer need to be studied in people.

If found to be safe and effective in a clinical trial, a drug, device, or treatment approach may be approved by the U.S. Food and Drug Administration (FDA).

Everyone with cancer should carefully consider all of the treatment options available for their cancer type, including standard treatments and clinical trials. Talk to your care team about whether a clinical trial may make sense for you.

## Phases

Most cancer clinical trials focus on treatment and are done in phases.

- **Phase 1** trials study the safety and side effects of an investigational drug or treatment approach.
- **Phase 2** trials study how well the drug or approach works against a specific type of cancer.
- **Phase 3** trials test the drug or approach against a standard treatment. If the results are good, it may be approved by the FDA.
- **Phase 4** trials study the safety and benefit of an FDA-approved treatment.

## Who can enroll?

It depends on the clinical trial's rules, called eligibility criteria. The rules may be about age, cancer type and stage, treatment history, or general health. They ensure that participants are alike in specific ways and that the trial is as safe as possible for the participants.

## Informed consent

Clinical trials are managed by a research team. This group of experts will review the study with you in detail, including its purpose and the risks and benefits of joining. All of this information is also provided in an informed consent form. Read the form carefully and ask questions before signing it. Take time to discuss it with people you trust. Keep in mind that you can leave and seek treatment outside of the clinical trial at any time.

#### Will I get a placebo?

Placebos (inactive versions of real medicines) are almost never used alone in cancer clinical trials. It is common to receive either a placebo with a standard treatment, or a new drug with a standard treatment. You will be informed, verbally and in writing, if a placebo is part of a clinical trial before you enroll.

#### Are clinical trials free?

There is no fee to enroll in a clinical trial. The study sponsor pays for research-related costs, including the study drug. But you may need to pay for other services, like transportation or childcare, due to extra appointments. During the trial, you will continue to receive standard cancer care. This care is often covered by insurance.

## Chemotherapy

Chemotherapy is a class of drugs that has been used for decades to treat pancreatic cancer. It kills fast-growing cells, including cancer cells, by stopping the process by which cells make more cells. This process is called cell division.

A medical oncologist is a health professional who is an expert in treating cancer with chemotherapy and other cancer drugs. They will be a member of your care team.

#### Types of chemotherapy

There are several types of chemotherapy. Each type stops cell division in its own way.



### Finding a clinical trial

#### In the United States

NCCN Cancer Centers

[NCCN.org/cancercenters](https://www.nccn.org/cancercenters)

The National Cancer Institute (NCI)  
[cancer.gov/about-cancer/treatment/clinical-trials/search](https://cancer.gov/about-cancer/treatment/clinical-trials/search)

#### Worldwide

The U.S. National Library of Medicine (NLM)  
[clinicaltrials.gov](https://clinicaltrials.gov)

#### Need help finding a clinical trial?

NCI's Cancer Information Service (CIS)  
1.800.4.CANCER (1.800.422.6237)  
[cancer.gov/contact](https://cancer.gov/contact)

Chemotherapy treatment of pancreatic cancer always includes a drug called an antimetabolite. These drugs are:

- Fluorouracil (also called 5-FU)
- Gemcitabine
- Capecitabine (Xeloda)

People with better health may receive more than 1 antimetabolite or a combination of drug

types. Other types of chemotherapy that treat pancreatic cancer are:

- Platinum chemotherapy – Oxaliplatin (Eloxatin), cisplatin
- Taxanes – Paclitaxel with human albumin (Abraxane), docetaxel (Taxotere, Docivyx)
- Topoisomerase inhibitors – Irinotecan (Onivyde)

Leucovorin is folic acid and is sometimes given with chemotherapy. It enhances the effect of some chemotherapies or reduces health issues caused by chemotherapy.

#### How is chemotherapy given?

Chemotherapy is given in cycles of treatment days followed by days of rest. The cycles vary in length depending on which drugs are used.

Most chemotherapies are administered by infusion through a needle inserted into a vein. An infusion is a slow drip, controlled by a pump, that may take hours. You may get an implanted device called a port to make getting infusions easier.

Fluorouracil can be given by infusion or by a faster injection called a bolus.

Capecitabine is the only chemotherapy for pancreatic cancer that is a pill. You can take it at home.

#### Side effects

Cancer treatment can cause unwanted health issues, called side effects. Side effects from chemotherapy are caused by the death of fast-growing normal cells. Examples include nausea and vomiting, anemia, and hair loss.

#### What is chemotherapy?

**Chemotherapy is a type of cancer drug used to kill cancer cells. It's typically slowly injected into a vein while you sit in a chair. Some people, like this person, receive the medicine through a port implanted in their chest.**





## Targeted therapy

Targeted therapy is a newer drug treatment for cancer than chemotherapy but has been used for years. It works by stopping the specific ways pancreatic cancer cells grow.

### Kinase inhibitors

Kinase inhibitors stop chemical signals that tell pancreatic cancer cells to grow, so fewer new cancer cells are made. They work inside of cells to turn off growth signals. Kinase inhibitors are pills that can be taken at home.

#### Types of kinase inhibitors

There are several kinase inhibitors that treat pancreatic cancer:

- Erlotinib (Tarceva) stops EGFR signals.
- Larotrectinib (Vitrakvi), entrectinib (Rozlytrek), and repotrectinib (Augtyro) stop TRK signals.
- Dabrafenib (Tafinlar) stops BRAF signals and is given with trametinib (Mekinist), which stops BRAF signals by stopping MEK signals.
- Selpercatinib (Retevmo) stops RET signals.
- Adagrasib (Krazati) and sotorasib (Lumakras) stop KRAS signals.
- Selpercatinib (Retevmo) stops RET signals.
- Erdafitinib (Balversa) stops FGFR signals.

#### Side effects

Each kinase inhibitor has its own profile of side effects, but fatigue, diarrhea, and skin problems are common.

### Antibody therapy

Antibody therapy for pancreatic cancer is another type of targeted therapy. It works on the outside the cell to stop receptors on the surface of cells. Cell receptors receive and send signals like antennas.

Zenocutuzumab-zbco (Bizengri) is an antibody therapy that stops growth signals from receptors called HER2 and HER3. Its side effects include diarrhea, musculoskeletal pain, and fatigue. It is given by infusion.

### PARP inhibitors

PARP inhibitors stop a protein that cancer cells use to repair damaged DNA. The damaged cancer cells then die. The 2 PARP inhibitors used to treat pancreatic cancer are olaparib (Lynparza) and rucaparib (Rubraca).

PARP inhibitors are pills that you can take at home. They may cause low blood cell counts which could put you at risk for infections, bleeding, and tiredness. Your care team will talk with you about the potential side effects.

### Antibody-drug conjugate

An antibody-drug conjugate combines 2 drugs in 1 medicine. One drug finds and attaches to cancer cells, and then the other drug attacks the cancer. Antibody-drug conjugates are given by infusion.

Fam-trastuzumab deruxtecan-nxki (Enhertu) attaches to a receptor called HER2 and releases chemotherapy into the cell.

Side effects of fam-trastuzumab deruxtecan-nxki are similar to classic chemotherapy side effects.



## Immune checkpoint inhibitors

Immune checkpoint inhibitors are also a newer drug treatment of cancer compared to chemotherapy. They are a type of immunotherapy that restores the ability of immune T cells to kill cancer cells.

### Types of immune checkpoint inhibitors

There are several types of immune checkpoint inhibitors. Each type restores the killing ability of T cells in a slightly different way. Immune checkpoint inhibitors that treat pancreatic cancer are:

- Pembrolizumab (Keytruda), nivolumab (Opdivo), and dostarlimab-gxly (Jemperli), which are PD-1 inhibitors.
- Ipilimumab (Yervoy), which is a CTLA-4 inhibitor.

Immune checkpoint inhibitors are given by infusion. Treatment occurs in cycles of treatment days followed by days of rest. The cycles vary in length depending on which drugs are used.

### Side effects

Immune checkpoint inhibitors may cause your immune cells to attack your healthy cells. This can lead to a wide range of symptoms because many parts of the body could be affected. You may have symptoms in your skin, mouth, glands, bowel, liver, and other organs.

## Managing side effects

Information on managing common treatment side effects can be found in the library of **NCCN Guidelines for Patients**, available at [NCCN.org/patientguidelines](https://www.nccn.org/patientguidelines) and on the **NCCN Patient Guides for Cancer** app.



## Surgery

Surgery is a treatment that removes tumors or body tissue with cancer. Although most pancreatic cancers are not treated with surgery, more people with pancreatic cancer are having surgery than in the past because of medical advances.

The goal of surgery is to remove the pancreatic tumor and nearby lymph nodes. Lymph nodes are small structures that are found throughout your body. They help fight disease. Sometimes, pancreatic cancer cells spread to lymph nodes.

Pancreatic surgery is complex. It's a long surgery with multiple steps. NCCN recommends having surgery at a care center that performs at least 15 to 20 pancreatic cancer surgeries every year.

There are several types of surgery for pancreatic surgery, which are explained in *Chapter 7: Treatment with surgery*.

Common side effects of surgery are scars, swelling, and local pain. Pain often lessens over time. You might need pancreatic enzyme replacement to help digest your food.

## Radiation therapy

Radiation therapy uses high-energy x-rays to kill or damage pancreatic cancer cells. A radiation oncologist is an expert in treating cancer with radiation. Your radiation oncologist

will lead a team that designs your treatment plan and gives radiation therapy.

The most common method to treat pancreatic cancer is called external beam radiation therapy (EBRT). A large machine makes radiation fields that are shaped to the form of the tumor. The machine aims the highest radiation dose at the cancer. Nearby healthy tissue may receive some radiation in the process.

Stereotactic body radiation therapy (SBRT) is a specialized form of EBRT. It treats cancer with very precise, high-dose radiation beams. SBRT is finished in 5 or fewer sessions. Most people have no side effects from SBRT.

### What is radiation therapy?

**Radiation therapy is the use of high-energy radiation to kill cancer cells. During treatment, you will lie still on a table (shown).**



## Chemoradiation

Chemoradiation is a cancer treatment that combines chemotherapy and radiation therapy. Chemotherapy may make it easier to kill cancer cells with radiation.

For pancreatic cancer, chemotherapy and radiation therapy are given during the same time frame. This is called concurrent chemoradiation. Adding chemotherapy to radiation therapy often causes more side effects than having radiation therapy by itself.

might need to take enzymes to digest your food after surgery.

- Radiation therapy treats a specific area of cancer with high-energy x-rays. Stereotactic body radiation therapy (SBRT) is technique for delivering radiation more precisely and often has no side effects.
- Chemotherapy and radiation therapy can be combined to treat pancreatic cancer. This is called chemoradiation. It causes more side effects than radiation therapy alone.

## What's next?

A treatment plan usually includes treatment for cancer and support for you.

Supportive care addresses the challenges of cancer. It includes preventing or relieving treatment side effects discussed in this chapter. The next chapter focuses on supportive care for health issues caused by pancreatic cancer.

## Questions to ask

- What are the common and serious side effects of my treatment?
- How will you prevent side effects of treatment?
- How many pancreatic surgeries have you performed in the past year?
- Is there an open clinical trial that's a good fit for me?

## Key points

- A clinical trial is a recommended way to receive potential new treatments for pancreatic cancer.
- Chemotherapy, targeted therapy, and immunotherapy are types of drugs that treat pancreatic cancer. Cancer drugs can cause side effects in several areas of the body.
- Pancreatic surgery is complex and should be done at a high-volume center. You

# 4

## Supportive care for cancer complications

- 27 What is supportive care?
- 28 Blocked bile duct
- 29 Low levels of digestive enzymes
- 29 Loss of appetite
- 29 Cancer-related pain
- 30 Blood clots and bleeding
- 31 Distress and depression
- 31 Cancer-related fatigue
- 31 What's next?
- 32 Key points
- 32 Questions to ask

**Pancreatic cancer often causes health issues. Supportive care includes treatment for these cancer complications. It can also address other challenges brought on by having cancer.**

### What is supportive care?

Supportive care helps improve your quality of life during and after cancer treatment. The goal is to prevent or manage side effects and symptoms, like pain and cancer-related fatigue. It also addresses the mental, social, and spiritual concerns faced by those with cancer.

Supportive care is available to everyone with cancer and their families, not just those at the

end of life. Palliative care is another name for supportive care.

Supportive care can also help with:

- Making treatment decisions
- Coordinating your care
- Paying for care
- Planning for advance care and end of life

It's important to know that you can get support for the challenges caused by cancer. Your care team will help you get the supportive care you need.

Read more about the types of support you may receive in *NCCN Guidelines for Patients: Palliative Care*.

This chapter focuses on care for some common health issues caused by pancreatic cancer.

**A palliative care specialist has received specific training to provide additional support to you. Their care focuses on relieving symptoms and reducing stress. A palliative care specialist may be a doctor, nurse, or other type of care provider. Some cancer centers have palliative care programs.**



## Blocked bile duct

Pancreatic tumors often grow large enough to block a bile duct. A bile duct is a small tube-shaped structure that drains fluid called bile from the liver. The common bile duct runs through the head of the pancreas where most pancreatic tumors grow.

A blocked bile duct can cause a range of symptoms. Often, people have yellowed eyes or skin called jaundice. You could have pain, a fever, or itchiness.

There are 3 ways to treat a blocked duct:

- The most common way is to place a small expandable tube, called a stent, inside the bile duct during a procedure called endoscopic retrograde cholangiopancreatography (ERCP).

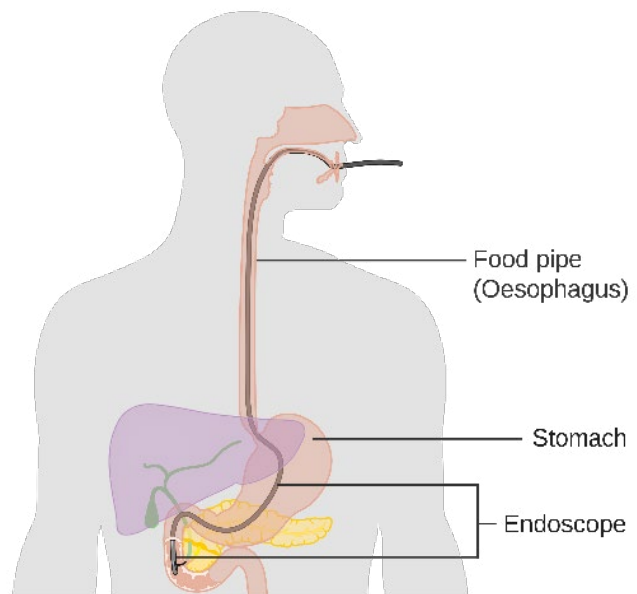
- Bile can be drained from the duct through a long, soft tube, called a catheter, to a bag outside your body then possibly later into your intestine.
- A surgery called a biliary bypass can be performed, which connects the small intestine to the common bile duct above the pancreas.

The preferred method is to unblock the bile duct with a stent inserted during ERCP.

### Blocked bile duct

**An endoscopic retrograde cholangiopancreatography (ERCP) may be used to open a blocked bile duct. The endoscopist will guide an endoscope tube down your throat to the small intestine. An x-ray video will show the endoscope moving inside your body. Next, the doctor will insert a stent into the blocked duct.**

Credit: commons.wikimedia.org/wiki/File:Diagram\_showing\_an\_endoscopic\_retrograde\_cholangio\_pancreatography\_(ERCP)\_CRUK\_097.svg





## Blocked stomach

A pancreatic tumor may grow large enough to block food from leaving your stomach. The blockage can cause pain, vomiting, and weight loss.

Treatments for a blocked stomach include:

- Bypassing the blockage with an endoscopic or surgical gastrojejunostomy that connects the bottom of the stomach to the middle of the small intestine
- Opening the blockage with a stent that is placed in during an endoscopy
- Relieving stomach pressure with a venting percutaneous endoscopic gastrostomy tube (PEG or G-tube) that is inserted through the skin into the stomach

In addition to a gastrojejunostomy, you may receive a feeding tube. A PEG tube can be used as a feeding tube. A J-tube is also a feeding tube that is inserted through the skin into the small intestine.

## Low levels of digestive enzymes

The pancreas makes enzymes that break down proteins, fats, sugars, and starches in food. Pancreatic cancer or its treatment may cause the pancreas to make fewer enzymes. This is called exocrine pancreatic insufficiency.

### Pancreatic enzyme replacement

You may have trouble digesting food without enough pancreatic enzymes. Pancreatic

enzyme replacement gives you the digestive enzymes you may not have enough of. You'll need to take several capsules while you eat.

### Nutritional counseling

People with exocrine pancreatic insufficiency don't absorb enough nutrients from food. They may experience malnutrition as a result. A registered dietitian may meet with you if you experience malnutrition. They are experts in nutrition and meal planning.

## Loss of appetite

People with advanced pancreatic cancer often have a loss of appetite called anorexia. Chemotherapy may worsen anorexia.

Olanzapine (Zyprexa) is a prescribed drug that can increase appetite and weight gain. A low dose taken every day often has good results with minimal side effects. Some side effects of olanzapine are sleepiness, dizziness and constipation.

## Cancer-related pain

Most people with advanced pancreatic cancer have cancer-related pain. A large tumor can cause pain by pressing on nearby organs. Pancreatic cancer can also spread to nearby nerves and cause severe pain.

Working with a palliative care specialist or a pain specialist soon after your cancer diagnosis may be helpful.

Pain from pancreatic cancer may be managed with:

- Pain medicine using opioids that are given around the clock (which works better than taking these medicines as needed)
- Injection of a nerve block into the celiac plexus nerve bundle (called celiac plexus neurolysis) during endoscopic ultrasound or through the skin guided by imaging
- Radiation therapy or radiosurgery targeting the celiac plexus
- Stereotactic body radiation therapy to shrink the cancer and relieve pain

If pain medicine doesn't control the pain well or has troublesome side effects, there are 3 other options:

- High-intensity focused ultrasound
- Tumor-directed radiation therapy with or without chemotherapy if it's not part of your cancer treatment
- A pain pump to give medicine directly to the spinal cord (also called intrathecal drug delivery)

## Blood clots and bleeding

Pancreatic cancer can cause blood to thicken and form blood clots. This is called thromboembolic disease. Pancreatic cancer may also cause bleeding in the gastrointestinal (GI) tract at the location of the main tumor.

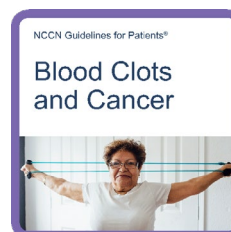
### Thromboembolic disease

When blood thickens, blood clots can form inside a blood vessel. As blood clots worsen, they can block enough blood flow to cause symptoms. Untreated blood clots may cause long-term problems or could be deadly.

Many blood clots are prevented or safely treated with medicine called anticoagulants:

- Low-molecular-weight heparin (LMWH)
  - This medicine enhances the effect of a natural anticoagulant in your body. It is injected into the skin and can be taken at home.
- Vitamin K blockers – Among these medicines, warfarin (Coumadin, Jantoven) is most often used. It is a pill taken at home. Warfarin stops the liver from using vitamin K, which is needed to make clotting proteins. LMWH is preferred over warfarin for treatment.
- Direct oral anticoagulants – These pills disable proteins that help the blood to clot. A direct oral anticoagulant may be used if the pancreatic tumor is not growing inside the stomach or intestine.

Read more about anticoagulants in *NCCN Guidelines for Patients: Blood Clots and Cancer*.





## Bleeding in the GI tract

GI bleeding may occur due to cancer-related ulcers or high blood pressure in the liver vein. If bleeding happens, you may have bloody stools or vomit blood. There are 3 treatments for bleeding:

- Endoscopic treatment
- Treatment with radiation if you haven't had radiation therapy in that area
- Blocking a blood vessel (embolization) that is bleeding with materials inserted through a long catheter tube that can be seen with an x-ray video (angiography)

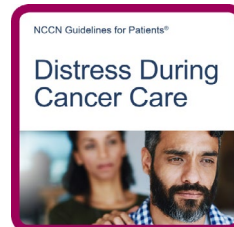
## Distress and depression

Everyone with cancer feels distressed at some point. It's normal to feel worried, sad, helpless, or angry. These feelings can make it harder to deal with cancer and cancer treatment. They can hold you back even when you want to move forward.

Depression is different than distress. It's not a short-lived moment of sadness. It's a health condition that makes people feel down or irritable or lose interest in enjoyable activities to the point they can't function normally.

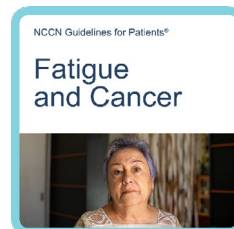
It's common for people with pancreatic cancer to have depression. There appears to be a biological link between the 2 health conditions. The challenges of pancreatic cancer also put people at risk for depression.

Getting help for distress or depression is an important part of supportive care. *NCCN Guidelines for Patients: Distress During Cancer Care* empowers people to get help.



## Cancer-related fatigue

Cancer-related fatigue is not the typical tiredness that follows an active or long day. It's a lack of energy that's distressing, doesn't improve with normal rest or sleep, and disrupts life. Learn about physical activity and other methods that reduce cancer-related fatigue in *NCCN Guidelines for Patients: Fatigue and Cancer*.



## What's next?

Learn how care teams decide the main treatment for pancreatic cancer in *Chapter 5: Planning primary treatment*.

## Key points

- Supportive care is health care that improves quality of life by addressing the challenges related to cancer.
- Your supportive care team may include a palliative care specialist, registered dietitian, and pain specialist.
- Pancreatic cancer can block bile ducts and the stomach. Stents and surgery can bypass blockages.
- People with pancreatic cancer often have special nutritional needs. You might need to take enzymes that help your body digest food. Some people have a feeding tube. Olanzapine is a medicine that can increase appetite and weight gain.
- Pain is often managed with opioids, nerve blocks, or radiation therapy.
- Bleeding can be stopped with endoscopic treatment, radiation, or embolization.
- The library of NCCN Guidelines for Patients has books on blood clots, distress, and fatigue.

## Questions to ask

- When will we discuss a supportive care plan for me?
- Who can I speak to about nutritional symptoms and concerns?
- Who can help me with health insurance and paying my bills?
- How will you relieve the symptoms I have?
- Who should I contact if my symptoms get worse?



**Let us know what  
you think!**

**Please take a moment to  
complete an online survey about  
the NCCN Guidelines for Patients.**  
[NCCN.org/patients/response](https://www.nccn.org/patients/response)

# 5

## Planning primary treatment

- 34 Options for primary treatment
- 34 Important deciding factors
- 35 What's next?
- 35 Key points
- 35 Questions to ask

**The main treatment used to control cancer growth is called primary treatment, which for most pancreatic cancers is cancer drugs. Surgery may be an option if there are no clear signs of distant cancer spread. Read this chapter to learn which of these main treatments is the option for you.**

## Options for primary treatment

Treatment of pancreatic cancer may consist of 1 treatment or multiple types of treatments. The treatment that is most important is called primary treatment. Primary treatment is most likely to achieve the best results.

Not everyone with pancreatic cancer has the same primary treatment. The best treatment for you may not be the best treatment for someone else.

There are 2 main types of primary treatment for pancreatic cancer:

- **Systemic therapy**, which kills cancer cells throughout the body with prescription drugs.
- Surgery, which removes tumors and body tissue that has pancreatic cancer.

## Important deciding factors

Your care team will consider many factors to decide which primary treatment is best for you. This section describes 3 of these factors.

### Cancer stage

Which primary treatment you receive depends largely on what stage your cancer is. A cancer stage is a rating of the extent of the cancer.

The stages of pancreatic cancer range from stage 0 to stage 4. A lower number means the cancer has grown less, and a higher number means it has grown more.

Most people with pancreatic cancer can't have surgery because the cancer has spread far. Distant spread is called metastatic or stage 4 pancreatic cancer.

The primary treatment of metastatic pancreatic cancer is systemic therapy. The goal of treatment is to control cancer, prolong life, and manage symptoms.

If the cancer is not metastatic, your care team will decide if surgery is an option based on other factors.

### Cancer growth to blood vessels

The goals of surgery are to safely remove all the cancer to extend life and improve quality of life. These goals may be reached if the cancer hasn't grown much outside of the pancreas.

NCCN recommends that a multidisciplinary team decides together if surgery is an option. Larger pancreatic cancers are harder or impossible to remove. Most often, pancreatic

cancer can't be removed because of major growth to nearby blood vessels.

Pancreatic cancers that are not metastatic are divided into 3 groups:

- **Resectable** means that a surgeon can remove the cancer. To improve outcomes, you may receive other types of treatment before or after surgery.
- **Borderline resectable** means that a surgeon would have a hard time safely removing all the cancer. Treatment to shrink the cancer should be received first.
- **Locally advanced** means that the cancer can't be removed at this time. However, the cancer is not metastatic, and some people can have surgery after getting other types of treatment.

## Performance status

Performance status is your ability to do day-to-day activities. Cancer and other diseases can limit what you can do. Limited ability is a sign of poor overall health.

Early-stage pancreatic cancer often doesn't limit performance status, but late stages might.

If your performance status is poor, surgery is not an option, and some systemic therapies may be harmful.

## What's next?

Now that you know your options for primary treatment, you can find more information about

your treatment in the next chapters:

- Options for cancer drugs are explained in *Chapter 6: Systemic therapy for primary treatment*.
- Surgical procedures and treatments used with surgery are explained in *Chapter 7: Surgery for primary treatment*.

## Key points

- The main treatments of pancreatic cancer are systemic therapy and surgery.
- Most people can't have surgery because the cancer has spread far or surgery would be too much for their body.
- Even when pancreatic cancer hasn't spread far, it might not be possible to remove because of major growth to nearby blood vessels.
- A multidisciplinary team should decide if the cancer can be removed (resectable), will be challenging to remove (borderline resectable), or is very unlikely to be removed (locally advanced) with an operation.

## Questions to ask

- Is systemic therapy or surgery the better primary treatment for me? What is the goal of treatment?
- Could surgery be an option for me in the future?
- Who will explain the treatment plan to me?

# 6

## Systemic therapy for primary treatment

- 37 Planning safe treatment
- 37 Options for initial treatment
- 38 NCCN levels of preference
- 39 First-line systemic therapy
- 42 Planning care after first-line therapy
- 43 Maintenance therapy for metastatic cancer
- 44 Second-line systemic therapy
- 47 What's next?
- 47 Key points
- 47 Questions to ask

**Systemic therapy is the main treatment for most pancreatic cancers. It treats pancreatic cancer anywhere in the body. Read this chapter to learn which cancer drugs may be options for you.**

The Eastern Cooperative Oncology Group (ECOG) Performance Status is a common scoring system. Its scores range from 0 to 4.

- Low scores of 0, 1, and 2 reflect better overall health. If you are fairly healthy, cancer treatment is likely to be safe.
- High scores of 3 or 4 reflect poorer overall health. Intense cancer treatment may be too harsh on your body if your scores are high.

## Planning safe treatment

An important part of treatment planning is deciding if cancer treatment is safe for you. Your care team will decide if cancer treatment is safe by assessing your overall health.

Your overall health is determined by your ability to do day-to-day activities. This ability is called performance status.

## Options for initial treatment

Your team will assess which treatments for pancreatic cancer are options for you. They will consider your performance status and any health issues caused by the cancer.

Options for initial treatment are explained next and are summarized in **Guide 4**.

### Guide 4

#### Initial treatment for locally advanced and metastatic pancreatic cancers

##### Performance status 0, 1, or 2

Options for locally advanced and metastatic cancers are:

- Treatment within a clinical trial (preferred)
- Systemic therapy

More options for some locally advanced cancers are:

- Chemotherapy followed by either chemoradiation or SBRT
- Chemoradiation or SBRT

##### Performance status 3 or 4

Options are:

- Supportive care including radiation therapy for symptom relief
- One chemotherapy drug or targeted therapy drug if appropriate

### Performance status 0, 1, or 2

In addition to cancer treatment, you should receive supportive care to address any challenges caused by cancer.

#### Clinical trial

You may be able to receive cancer treatment within a clinical trial. Participating in a clinical trial depends on whether there is an open trial enrolling people who have similar cancers. NCCN recommends a clinical trial over other options.

#### Systemic therapy

Systemic therapy is the most common treatment for locally advanced and metastatic pancreatic cancers. It includes chemotherapy, targeted therapy, and immunotherapy.

#### Chemoradiation and SBRT

There are 2 treatment approaches that include radiation therapy for locally advanced pancreatic cancer.

One approach starts with chemotherapy. After 4 to 6 months of chemotherapy, the cancer is then treated with chemoradiation or stereotactic body radiation therapy (SBRT).

The other approach starts with either chemoradiation or SBRT. These treatments relieve pain and open blockages caused by the cancer.

### Performance status 3 or 4

Many people with a performance score of 3 or 4 just receive supportive care. Supportive care aims to improve quality of life. It often includes treatment of cancer symptoms as explained in *Chapter 4: Supportive care for cancer complications*.

NCCN recommends that care teams consider systemic therapy for people with a performance score of 3. Options are listed later in this chapter in the section called *First-line systemic therapy*.

## NCCN levels of preference

A regimen is a plan for systemic therapy. It consists of 1 or more prescribed drugs that are taken at a specific dose, schedule, and length of time.

NCCN experts recommend regimens based on science and safety. When helpful, they assign a level of preference to their recommendations. There are 3 levels of preference:

- **Preferred therapies** have the most evidence they work better and may be safer than other therapies.
- **Other recommended therapies** may not work quite as well as preferred therapies, but they can still help treat cancer.
- **Therapies used in certain cases** work best for people with specific cancer features or health circumstances.

Preferred therapies for chemoradiation are capecitabine and fluorouracil (5-FU). The other recommended therapy is gemcitabine.

There are many options for systemic therapy when used as the main treatment of pancreatic cancer. NCCN recommendations are explained in the next section.



## First-line systemic therapy

The first regimen given is called first-line systemic therapy. During treatment, you will have a series of imaging scans to assess treatment results.

### Performance status 0 or 1

If you're in fairly good health, your team may recommend an intense regimen. Intense regimens often control cancer growth but can cause serious side effects. A list of first-line therapies for people with a good (low) performance status is in **Guide 5**.

#### Preferred therapies

Preferred therapies consist of multiple types of chemotherapy. **FOLFIRINOX** is short for this drug combination:

- FOL = leucovorin
- F = fluorouracil (also called 5-FU)
- IRIN = irinotecan
- OX = oxaliplatin

FOLFIRINOX is an intense treatment. The modified FOLFIRINOX regimen may have less severe side effects. It includes a slow drip of 5-FU instead of a fast injection.

**Gemcitabine-based chemotherapy** is an option for many cancers. Since platinum chemotherapy works better for cancers with *BRCA1*, *BRCA2*, or *PALB2* mutations, these cancers are treated with gemcitabine and cisplatin. Gemcitabine and albumin-bound paclitaxel is an option for cancers without these mutations.

### Guide 5

#### Performance status 0 or 1: First-line therapy for locally advanced and metastatic pancreatic cancers

#### Preferred therapies

Options for all cancers:

- FOLFIRINOX or modified FOLFIRINOX
- Gemcitabine, albumin-bound paclitaxel
- NALIRIFOX

Options for cancers with *BRCA1*, *BRCA2*, or *PALB2* mutations:

- FOLFIRINOX or modified FOLFIRINOX
- Gemcitabine, cisplatin

#### Other recommended therapies

Options for all cancers:

- Gemcitabine
- Gemcitabine, capecitabine
- Gemcitabine, erlotinib
- Gemcitabine, albumin-bound paclitaxel, cisplatin
- CapeOx
- OFF
- GTX

More options for locally advanced cancers:

- Capecitabine
- 5-FU

#### Therapies used in certain cases

Based on biomarker testing:

- Dabrafenib, trametinib
- Larotrectinib or entrectinib or repotrectinib
- Pembrolizumab
- Selpercatinib

**NALIRIFOX** is a newer regimen for pancreatic cancers. It's short for these cancer drugs:

- NALIRI = Liposomal irinotecan
- F = 5-FU and leucovorin
- OX = oxaliplatin

NALIRIFOX is like FOLFIRINOX except for how irinotecan is made. Liposomal irinotecan in NALIRIFOX has advantages over standard irinotecan, such as causing fewer side effects. On the downside, it is more costly.

### Other recommended therapies

Other recommended therapies consist of 1 or more types of chemotherapy. They may extend life, delay cancer growth, and reduce symptoms.

Options include **1** chemotherapy drug (gemcitabine, capecitabine, or 5-FU). These chemotherapies are sometimes combined with each other or other medicines. For example:

- Gemcitabine may be combined with albumin-bound paclitaxel plus cisplatin or combined with an EGFR kinase inhibitor called erlotinib.
- The CapeOX regimen consists of capecitabine and oxaliplatin.
- The GTX regimen consists of gemcitabine, docetaxel, and capecitabine.
- The OFF regimen consists of leucovorin, 5-FU, and oxaliplatin.

### Therapies used in certain cases

Targeted therapy or immunotherapy is an additional option for some people:

- Dabrafenib plus trametinib treats cancers with the *BRAF V600E* mutation.
- Larotrectinib, entrectinib, and repotrectinib treat cancers with a *NTRK* gene fusion.
- Pembrolizumab treats cancers with high microsatellite instability, mismatch repair deficiency, or high tumor mutational burden.
- Selpercatinib treats cancers with a *RET* gene fusion.

### Performance status 2

If your performance status is 2, less intense regimens are used so that you likely won't have serious side effects from treatment. Options for people with a performance status of 2 are listed in **Guide 6**.

Preferred therapies consist of chemotherapy. You may receive a 1-drug regimen, such as capecitabine or gemcitabine. Other regimens combine different types of chemotherapy, such as gemcitabine plus albumin-bound paclitaxel.

Additional options for metastatic cancers are:

- FOLFOX (leucovorin, 5-FU, oxaliplatin)
- FOLFIRI (leucovorin, 5-FU, irinotecan)
- CapeOx (capecitabine, oxaliplatin)

Based on biomarker testing, targeted therapy or immunotherapy is an additional option for some people as explained above.

### Performance status 3

Your team will consider whether systemic therapy may help you. Options for people with a performance status of 3 are listed in **Guide 7**.

Preferred therapies for locally advanced cancers are capecitabine, 5-FU, or gemcitabine.

There are no preferred therapies for metastatic cancers because of the small benefits of treatment. You may receive one chemotherapy drug or based on biomarker testing, immunotherapy or targeted therapy.

#### Guide 6

#### Performance status 2: First-line therapy for locally advanced and metastatic pancreatic cancers

##### Preferred therapies

Options for all cancers:

- Capecitabine
- Gemcitabine
- Gemcitabine, albumin-bound paclitaxel

More options for metastatic cancers:

- FOLFOX
- FOLFIRI
- CapeOx

##### Therapies used in certain cases

Based on biomarker testing:

- Dabrafenib, trametinib
- Larotrectinib or entrectinib or repotrectinib
- Pembrolizumab
- Selpercatinib

#### Guide 7

#### Performance status 3: First-line therapy for locally advanced and metastatic pancreatic cancers

##### Preferred therapies

Options for locally advanced cancers:

- Capecitabine
- 5-FU
- Gemcitabine

##### Other recommended therapies

Options for metastatic cancers:

- Capecitabine
- 5-FU
- Gemcitabine

##### Therapies used in certain cases

Options for metastatic cancers based on biomarker testing:

- Pembrolizumab
- Larotrectinib or entrectinib or repotrectinib
- Dabrafenib, trametinib

## Planning care after first-line therapy

Your care team will decide the next steps of care are based on your current performance status.

If your performance status declined, it may mean that your overall health is now poor. In this case, you will receive supportive care. Your team may recommend single-agent chemotherapy or targeted therapy.

If you're fairly healthy, the next steps of care are based on whether there are signs of cancer growth.

### No signs of cancer growth

For locally advanced pancreatic cancer that has shrunk or is stable, the next options include:

- Undergoing surgery, if all the cancer can be removed, as explained in *Chapter 7: Surgery for primary treatment*
- Continuing with first-line systemic therapy
- Ongoing testing to watch for cancer growth
- Joining a clinical trial

For metastatic pancreatic cancer that has shrunk or is stable, the next options include:

- Starting maintenance therapy and for some people, additional local treatment of the metastasis
- Joining a clinical trial
- Taking a break from chemotherapy

### Signs of cancer growth

For pancreatic cancer that has likely grown, the next options include:

- Joining a clinical trial (preferred)
- Second-line systemic therapy as explained later in this chapter

A third option for locally advanced cancer is chemoradiation or SBRT. These treatments may be options if not received before and there are no distant metastases.



**Advocate for yourself! Don't be afraid to ask for a second opinion. Don't be afraid to ask for help from friends and family who just want to be told what you need, whether that means food, a ride, help around the house, or to be left alone to rest."**

## Maintenance therapy for metastatic cancer

If first-line therapy controlled the growth of metastatic pancreatic cancer, your treatment may shift to maintenance therapy. The goal of maintenance therapy is to stop cancer growth for as long as possible.

Maintenance therapy is based on the prior regimen. NCCN has assigned levels of preference to their recommendations, which are listed in **Guide 8**.

For people with a *BCRA1* or *BCRA2* mutation, olaparib is the preferred therapy after having platinum-based chemotherapy. Cisplatin and oxaliplatin are platinum chemotherapies. Rucaparib after platinum chemotherapy is also

an option for people with *BCRA1*, *BCRA2*, or *PALB2* mutations.

After FOLFIRINOX, capecitabine is commonly used for maintenance therapy. If you had to stop taking FOLFIRINOX because of side effects, you may have more options. If oxaliplatin caused health issues, you may start taking 5-FU plus leucovorin or FOLFIRI. If irinotecan caused health issues, FOLFOX is an option for maintenance therapy.

If you took gemcitabine plus albumin-bound paclitaxel, you may continue this treatment on a modified schedule or only take gemcitabine

### Guide 8

#### Maintenance therapy for metastatic pancreatic cancer

<b>Preferred therapies</b>	<p>If you had platinum-based chemotherapy, the option is:</p> <ul style="list-style-type: none"> <li>• Olaparib for people with a <i>BCRA1</i> or <i>BCRA2</i> mutation</li> </ul>
<b>Other recommended therapies</b>	<p>If you had first-line FOLFIRINOX, the option is:</p> <ul style="list-style-type: none"> <li>• Capecitabine</li> </ul> <p>If you had gemcitabine and albumin-bound paclitaxel, the options are:</p> <ul style="list-style-type: none"> <li>• Gemcitabine</li> <li>• Gemcitabine, albumin-bound paclitaxel modified schedule</li> </ul>
<b>Therapy used in certain cases</b>	<p>If you had FOLFIRINOX, the options are:</p> <ul style="list-style-type: none"> <li>• 5-FU, leucovorin</li> <li>• FOLFOX</li> <li>• FOLFIRI</li> </ul> <p>If you had platinum-based chemotherapy, the option is:</p> <ul style="list-style-type: none"> <li>• Rucaparib for people with <i>BCRA1</i>, <i>BCRA2</i>, or <i>PALB2</i> mutations</li> </ul>

## Second-line systemic therapy

Pancreatic cancer is often treated with multiple lines of therapy. Second-line therapy is the second regimen received.

NCCN recommendations for second-line therapy are explained in this section. Recommendations are based on performance status and have been assigned levels of preference.

If more lines of therapy are needed, the regimens in this section may be options.

### Performance status 0 or 1

There are many options for second-line therapy if you're in fairly good health. A list of options is in **Guide 9**.

#### Preferred therapies

Some second-line immunotherapies and targeted therapies have better results than other treatments. The preferred therapies are:

- Larotrectinib, entrectinib, or repotrectinib for cancers with a *NTRK* gene fusion.
- Pembrolizumab for cancers with high microsatellite instability, mismatch repair deficiency, or high tumor mutational burden.

#### Other recommended therapies

Targeted therapy is an option for some people:

- Dabrafenib plus trametinib treats cancers with the *BRAF V600E* mutation.

### Guide 9

#### Performance status 0 or 1: Second-line therapy for locally advanced and metastatic pancreatic cancers

##### Preferred therapies

Based on biomarker testing:

- Larotrectinib or entrectinib or repotrectinib
- Pembrolizumab

##### Other recommended therapies

Based on biomarker testing:

- Dabrafenib, trametinib
- Selpercatinib

Based on prior treatment:

- Dostarlimab-gxly
- Nivolumab, ipilimumab
- 5-FU, leucovorin
- 5-FU
- FOLFIRI
- FOLFIRINOX or modified FOLFIRINOX
- FOLFOX
- OFF
- Capecitabine
- CapeOx
- Gemcitabine
- Gemcitabine, albumin-bound paclitaxel
- Gemcitabine, cisplatin
- Gemcitabine, erlotinib
- Gemcitabine, albumin-bound paclitaxel, cisplatin
- 5-FU, leucovorin, liposomal irinotecan

##### Therapies used in certain cases

Based on biomarker testing:

- Adagrasib or sotorasib
- Erdafitinib
- Fam-trastuzumab deruxtecan-nxki
- Zenocutuzumab-zbco

- Selpercatinib treats cancers with a *RET* gene fusion.

If you haven't had immunotherapy before, your options may include:

- Dostarlimab-gxly if the cancer has high microsatellite instability, mismatch repair deficiency, or high tumor mutational burden.
- Nivolumab plus ipilimumab if the cancer has high tumor mutational burden.

Second-line chemotherapy usually differs from the type you had before:

- Regimens with fluoropyrimidine (5-FU or capecitabine) are used after regimens with gemcitabine.
- Regimens with gemcitabine are used after fluoropyrimidine-based therapy.

One exception is 5-FU, leucovorin, and liposomal irinotecan. This regimen may be an option even if you had 5-FU before, but you must not have already had irinotecan.

### Therapies used in certain cases

One of these therapies for pancreatic cancer may be an option for you:

- Adagrasib and sotorasib treat cancers with the *KRAS* G12C mutation.
- Erdafitinib treats cancers with a *FGFR* genetic alteration.
- Fam-trastuzumab deruxtecan-nxki treats cancers that have HER2 overexpression.
- Zenocutuzumab-zbco treats cancers with a *NRG1* gene fusion.

## Performance status 2

NCCN recommendations for people with a performance status of 2 are listed in

### Guide 10.

### Preferred therapies

Preferred therapies consist of chemotherapy:

- If you had gemcitabine-based chemotherapy, you may receive 5-FU, leucovorin, and liposomal irinotecan.
- If you had 5-FU or capecitabine, the cancer may be treated with gemcitabine plus albumin-bound paclitaxel.

## Guide 10

### Performance status 2: Second-line therapy for locally advanced and metastatic pancreatic cancers

### Preferred therapies

- 5-FU, leucovorin, liposomal irinotecan
- Gemcitabine, albumin-bound paclitaxel

### Other recommended therapies

- Capecitabine
- 5-FU
- Gemcitabine

### Therapies used in certain cases

Based on biomarker testing:

- Adagrasib or sotorasib
- Dabrafenib, trametinib
- Erdafitinib
- Fam-trastuzumab deruxtecan-nxki
- Larotrectinib or entrectinib or repotrectinib
- Zenocutuzumab-zbco
- Dostarlimab-gxly
- Pembrolizumab
- Nivolumab, ipilimumab



**Other recommended therapies**

You may receive 1 chemotherapy drug: capecitabine, 5-FU, or gemcitabine.

**Therapies used in certain cases**

Targeted therapy is an additional option for some people:

- Adagrasib and sotorasib treat cancers with the *KRAS* G12C mutation.
- Dabrafenib plus trametinib treats cancers with the *BRAF* V600E mutation.
- Erdafitinib treats cancers with a *FGFR* genetic alteration.
- Larotrectinib, entrectinib, and repotrectinib treat cancers with a *NTRK* gene fusion.
- Zenocutuzumab-zbco treats cancers with a *NRG1* gene fusion.
- Fam-trastuzumab deruxtecan-nxki treats cancers that have HER2 overexpression.

If you haven't had immunotherapy before, your options may include:

- Dostarlimab-gxly if the cancer has high microsatellite instability or mismatch repair deficiency
- Pembrolizumab if the cancer has high microsatellite instability, mismatch repair deficiency, or high tumor mutational burden
- Nivolumab plus ipilimumab if the cancer has high tumor mutational burden

**Performance status 3**

Your team will consider whether systemic therapy may help you. NCCN recommendations for people with a performance status of 3 are listed in **Guide 11**.

- You may receive one chemotherapy drug.
- Based on biomarker testing, immunotherapy or targeted therapy may be options.

**Guide 11****Performance status 3: Second-line therapy for locally advanced and metastatic pancreatic cancers****Other recommended therapies**

- Capecitabine
- 5-FU
- Gemcitabine

**Therapies used in certain cases**

Based on biomarker testing:

- Dabrafenib, trametinib
- Erdafitinib
- Larotrectinib or entrectinib or repotrectinib
- Adagrasib or sotorasib
- Pembrolizumab
- Dostarlimab-gxly

## What's next?

It's common to have many concerns about cancer. Your care team will support you. More sources of support are listed in *Chapter 8: Other resources*.

## Key points

- Your care team will create a safe treatment plan for you based on your overall health.
- If cancer treatment could be too harsh on your body, you will receive supportive care. You may also receive a simple regimen of cancer drugs.
- If you can receive cancer treatment, your care team will prescribe a drug regimen that has the best chance of controlling the growth of the cancer and is unlikely to cause serious health issues.
- Some people with locally advanced cancer also receive chemoradiation or radiation therapy.
- Maintenance therapy for metastatic cancer stops cancer growth for as long as possible.

## Questions to ask

- How did you decide what treatment is best for me? Did you use the results of genetic or biomarker testing?
- What type of systemic therapy will I get?
- What is the schedule, or cycles, of the systemic therapy?
- Are you suggesting options other than what NCCN recommends? If yes, why?

# 7

## Surgery for primary treatment

- 49 Stopping cancer growth before surgery
- 51 How pancreatic cancer is removed
- 53 Decisions during surgery
- 53 Killing cancer after surgery
- 55 Follow-up care
- 55 If the cancer comes back
- 57 What's next?
- 57 Key points
- 57 Questions to ask

**Surgery is the only current treatment that may cure pancreatic cancer. This chapter describes the types of surgery for pancreatic cancer. It also explains other treatments that may be given before and after surgery.**

### Stopping cancer growth before surgery

Neoadjuvant therapy is cancer treatment that's given before the main treatment, which is surgery in this case. It may shrink pancreatic cancer and have other benefits.

- The first treatment of pancreatic cancer may be surgery if the cancer can be removed and isn't touching any blood vessels (resectable). However, many treatment centers start with neoadjuvant therapy because most pancreatic cancers have spread outside the pancreas.
- Pancreatic cancer that will be a challenge to remove or touches important blood vessels (borderline resectable) is usually treated with neoadjuvant therapy first.

#### NCCN levels of preference

Systemic therapy is used for neoadjuvant therapy. A regimen of systemic therapy consists of 1 or more prescribed drugs that are taken at a specific dose, schedule, and length of time.

NCCN experts recommend regimens based on science and safety. When helpful, they assign a level of preference to their recommendations. There are 3 levels of preference:

- **Preferred therapies** have the most evidence they work better and may be safer than other therapies.
- **Other recommended therapies** may not work quite as well as preferred therapies, but they can still help treat cancer.
- **Therapies used in certain cases** work best for people with specific cancer features or health circumstances.

#### Neoadjuvant treatment options

NCCN recommends that neoadjuvant treatment be received at or managed by a high-volume center. You may receive up to 6 months of treatment. NCCN recommendations for neoadjuvant therapy are listed in **Guide 12**.

Preferred therapies include FOLFIRINOX and a gemcitabine combination. The modified FOLFIRINOX regimen may be received. This regimen includes a slow drip of fluorouracil (5-FU) and not the faster injection.

Research on which cancer drugs work best for neoadjuvant therapy is ongoing. Joining a clinical trial is encouraged.

Chemoradiation after chemotherapy is sometimes part of neoadjuvant therapy. The 2 preferred regimens for chemoradiation are capecitabine and 5-FU. Another recommended therapy is gemcitabine.

### Assessing treatment results after neoadjuvant therapy

After neoadjuvant therapy, you will have some tests that were done before. Tests that will be repeated are:

- Pancreatic protocol computed tomography (CT) or magnetic resonance imaging (MRI) of the abdomen
- CT scan of the chest and pelvis
- CA 19-9 blood test
- Positron emission tomography with CT or MRI (PET/CT or PET/MRI scan), if your care team thinks it's needed

The cancer may have grown or spread during treatment. Imaging may show a larger tumor. CA 19-9 levels may be higher.

When cancer worsens, it may be treated with a different neoadjuvant therapy if surgery still seems possible. If surgery is not an option, recommendations for treatment are listed in *Chapter 6: Systemic therapy for primary treatment*.

If there are no signs of cancer growth, your next treatment will likely be surgery. Surgery should be scheduled within 4 weeks after imaging.

### Guide 12

#### Neoadjuvant chemotherapy regimens for pancreatic cancer

There are 2 options for neoadjuvant chemotherapy. Both options are preferred therapies.

##### Option 1: FOLFIRINOX

FOLFIRINOX is an intense chemotherapy used to treat people with a performance score of 0 or 1. FOLFIRINOX is a short name for these cancer drugs:

- FOL = leucovorin
- F = fluorouracil (also called 5-FU)
- IRIN = irinotecan
- OX = oxaliplatin

##### Option 2: Gemcitabine combination

The gemcitabine combination used for most pancreatic cancers is:

- Gemcitabine, albumin-bound paclitaxel

Since platinum chemotherapy works better for pancreatic cancers with *BRCA1*, *BRCA2*, or *PALB2* mutations, the option for these cancers is:

- Gemcitabine, cisplatin

# How pancreatic cancer is removed

Your surgeon will schedule surgery if there's a good chance that all the cancer will be removed. They must see a way to remove the tumor with enough normal-looking tissue at its edge. This normal-looking tissue is called the surgical margin. The goal is to have no cancer cells in the margin so that a cure is likely.

## Methods to perform surgery

Your surgeon will remove tissue with one of 2 methods. The classic or open method is called laparotomy. The newer method is a less invasive surgery called laparoscopic surgery.

Surgeons perform laparotomy through 1 large cut in the middle of your body. Through the cut, your surgeon can see and access the pancreatic tumor.

Laparoscopic surgery is performed through several small cuts made in your abdomen. Your surgeon will insert surgical tools through the cuts. One of the tools is a laparoscope, which has a small video camera. The video of your inner abdomen will be displayed on a screen so the surgeon can guide the tools during surgery.

## Types of surgery

The type of surgery you will have depends on where the tumor is in the pancreas and how much it touches blood vessels.

### Surgery for a tumor in the pancreas head

The pancreas head is the right-sided part of the pancreas. A tumor in the pancreas head is treated with a pancreatoduodenectomy (also

called a **Whipple procedure**). This surgery removes these body parts:

- Some of the pancreas, common bile duct, and small intestine
- Gallbladder
- Nearby lymph nodes
- At times, some of the stomach

A classic Whipple procedure removes part of the stomach. A pylorus-preserving procedure does not.

### Surgery for a tumor in the pancreas body or tail

The pancreas body is the middle of pancreas, and the tail is the narrow left-sided part. A tumor in the pancreas body or tail is treated with a **distal pancreatectomy** and en-bloc splenectomy.

A distal pancreatectomy removes the body and tail of the pancreas, and an en-bloc splenectomy removes the entire spleen. The spleen is removed since pancreatic cancer often attaches to its blood vessels. The left adrenal gland might also be removed.

### Surgery for a tumor in the pancreas neck

The pancreas neck is between the head and body of the pancreas. A tumor in the pancreas neck may be treated with either an extended Whipple procedure, an extended distal pancreatectomy, or a total pancreatectomy.

An extended Whipple procedure and extended distal pancreatectomy remove more tissue than standard surgeries.

A **total pancreatectomy** removes these body parts:

Pancreas, spleen, and gallbladder

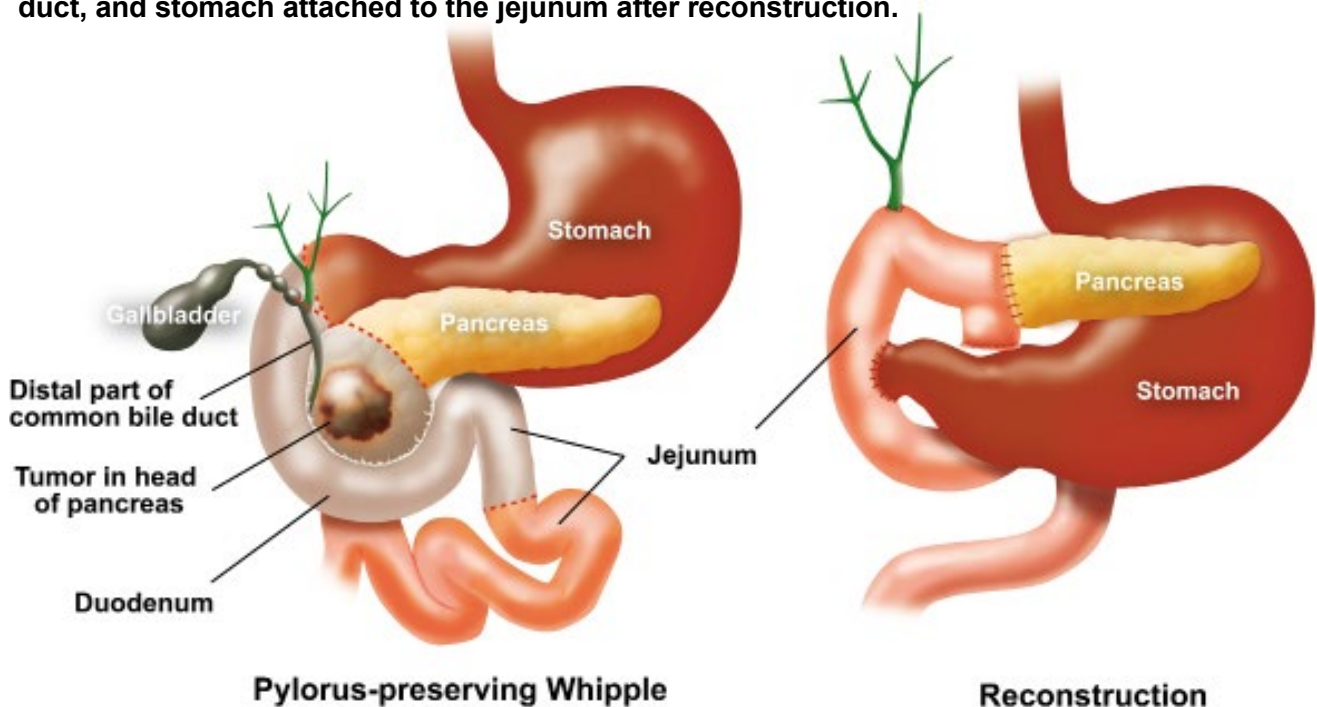
- Some of the stomach, small intestine, and common bile duct
- Nearby lymph nodes
- At times, parts of blood vessels

### Reconstruction

After removing the cancer, your surgeon will rebuild cut tissues. This is called reconstruction. New connections between body parts will be made. Blood vessels may also need reconstruction.

### Whipple procedure

A Whipple procedure is a type of pancreatic surgery. It is also called a pancreatoduodenectomy. This surgery removes at least the gallbladder and some of the pancreas, common bile duct, and small intestine (gray-colored parts in left image). The image on the right shows the pancreas, bile duct, and stomach attached to the jejunum after reconstruction.





## Decisions during surgery

Sometimes pancreatic surgeries are not completed. Your surgeon will explore your inner abdomen to see if the cancer has spread far. Metastatic cancer may not be seen in imaging scans but then will be found during surgery. If metastatic cancer is found, pancreatic surgery should not be done.

Pancreatic surgeries are also not completed if the tumor can't be safely removed. Your surgeon has a better view of the tumor during surgery. They may see that the tumor has grown so much around blood vessels that it can't be removed.

If your surgeon discovers the cancer can't be taken out during surgery, they may perform other procedures while you're still under anesthesia:

- Celiac plexus neurolysis is an injection of a nerve block into a nerve bundle called the celiac plexus to reduce pain
- Gastrojejunostomy is a surgery that connects part of the stomach to the jejunum (part of the small intestine) so that food doesn't get blocked by the tumor
- A biliary bypass is a surgery for when the bile duct is blocked, which can cause jaundice. The surgery connects the small intestine to the common bile duct above the pancreas to bypass the blockage.
- Instead of a bypass, placement of a small, expandable tube (stent) into the bile duct may be done to treat jaundice

When surgery isn't completed, the cancer will be treated by other methods to try to control its growth. Recommendations for treatment

are in *Chapter 6: Systemic therapy for primary treatment*.

## Killing cancer after surgery

Adjuvant therapy is cancer treatment that follows the main treatment. It kills cancer cells that weren't removed during surgery because they couldn't be seen. Killing any remaining cancer cells lowers the chance of cancer returning.

Adjuvant therapy can start when you've recovered enough from surgery. It's ideal to start within 12 weeks after surgery.

### Tests before treatment

Before adjuvant therapy, a few tests are needed.

You will have a CT scan with contrast of the chest, pelvis, abdomen and a CA 19-9 test.

These tests check for metastases and serve as a baseline for future tests. If tests show metastases, recommendations for treatment are in *Chapter 6: Systemic therapy for primary treatment*.

If genetic testing for inherited mutations was not done before, it will be done after surgery.

### Options for adjuvant therapy

Chemotherapy is used for adjuvant therapy. It may be the only treatment or it may be given with radiation therapy.

Your team will plan adjuvant therapy based on whether you had neoadjuvant therapy.

The recommended regimens for chemotherapy are listed in **Guide 13**.

### You didn't have neoadjuvant therapy

There are 3 treatment options:

- Receiving treatment within a clinical trial is the preferred option
- Chemotherapy
- Chemotherapy then chemoradiation as needed then possibly more chemotherapy

Options are based on the results of neoadjuvant therapy and other factors. You may have:

- More chemotherapy
- Chemoradiation as needed and if you didn't have it before

Chemotherapy is usually received for up to 6 months including the cycles received before surgery.

### You had neoadjuvant therapy

Adjuvant therapy may not be needed if there are no signs of cancer. Your team will decide if more treatment may be helpful.

## Guide 13

### Adjuvant chemotherapy regimens for pancreatic cancer

<b>Chemotherapy</b>	<p><b>Preferred therapies</b></p> <ul style="list-style-type: none"> <li>• Modified FOLFIRINOX if your performance score is 0 or 1</li> <li>• Gemcitabine, capecitabine</li> </ul> <p><b>Other recommended therapies</b></p> <ul style="list-style-type: none"> <li>• 5-FU, leucovorin</li> <li>• 5-FU</li> <li>• Gemcitabine</li> <li>• Capecitabine</li> </ul>
<b>Chemotherapy received before or after chemoradiation</b>	<p><b>Other recommended therapies</b></p> <ul style="list-style-type: none"> <li>• 5-FU, leucovorin</li> <li>• 5-FU</li> <li>• Gemcitabine</li> </ul>
<b>Chemoradiation</b>	<p><b>Preferred therapies</b></p> <ul style="list-style-type: none"> <li>• 5-FU, leucovorin</li> <li>• 5-FU</li> </ul> <p><b>Other recommended therapies</b></p> <ul style="list-style-type: none"> <li>• Gemcitabine</li> </ul>

## Follow-up care

Once there are no signs of cancer, surveillance is started. Surveillance is ongoing testing to see if the cancer has returned, which is called a recurrence.

### Surveillance tests

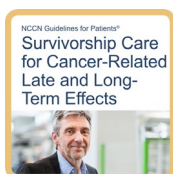
You'll meet with your team as needed for these tests:

- Medical history and physical exam to assess symptoms
- CA 19-9 levels
- CT scan of chest
- CT or MRI scan of abdomen and pelvis with contrast

### Checking for side effects

In addition to surveillance, your team will ask about side effects of the cancer and its treatment. Many side effects of treatment quickly resolve after treatment ends. Some effects persist or start long after treatment has ended.

Read about management of common side effects in *NCCN Guidelines for Patients: Survivorship Care for Cancer-Related Late and Long-Term Effects*, available at [NCCN.org/patientguidelines](https://www.nccn.org/patientguidelines) and on the [NCCN Patient Guides for Cancer](#) app.



### Setting goals for healthy living

It's important for everyone to start or keep a healthy lifestyle—but it's even more important for people who've had cancer. Healthy living can prevent disease. Your team will help you set and reach goals. Learn about goals for healthy living in *NCCN Guidelines for Patients: Survivorship Care for Healthy Living*.



## If the cancer comes back

Surveillance tests may find signs of pancreatic cancer. In this case, your care team may want a biopsy to confirm there is cancer. If not done before, genetic and biomarker tests are needed to help plan treatment.

Treatment of a recurrence is based on where the cancer is located. See **Guide 14** to learn the treatment options for a recurrence.

### Surgery

If cancer is only found in the pancreas, surgery may be an option. You'll need a surgical consult and a multidisciplinary team review of your test results.

### Clinical trial

Enrolling in a clinical trial may be an option. Ask your care team if there is a clinical trial that is a good fit for you. If there is an open trial, NCCN recommends this option over other options.

Systemic therapy

Systemic therapy is an option for cancer that returned near or far from the removed pancreas. Treatment for recurrence is based on these timeframes:

- If you had chemotherapy less than 6 months ago, you'll be switched from gemcitabine-based chemotherapy to fluoropyrimidine-based chemotherapy or the other way around. If you've had both of these therapies, a different chemotherapy will be started.
- If you had chemotherapy 6 or more months ago, you may repeat the same regimen you had before or start a new systemic therapy.

There are many options for systemic therapy. The regimens used for recurrence are the

same as those used for second-line therapy listed in *Chapter 6: Systemic therapy for primary treatment*.

If cancer returns near the area where the pancreas was removed, your team may recommend chemoradiation or stereotactic body radiation therapy (SBRT) in addition to systemic therapy.

The 2 preferred regimens for chemoradiation are capecitabine and 5-FU. The other recommended therapy is gemcitabine.

Radiation therapy

A recurrence near the area where the pancreas was removed may be treated with SBRT only. This treatment approach is not widely used for a local recurrence. It may be

Guide 14  
Treatment for pancreatic cancer that came back after surgery

The cancer returned in only the pancreas	Surgery may be an option
The cancer returned in the area where the pancreas was removed	There are 5 options: <ul style="list-style-type: none"><li>• Treatment within a clinical trial (preferred)</li><li>• Systemic therapy</li><li>• Systemic therapy followed by either chemoradiation or SBRT, if not received before</li><li>• SBRT</li><li>• Supportive care</li></ul>
The cancer returned far from where the pancreas is or was	There are 3 options. <ul style="list-style-type: none"><li>• Receive treatment in a clinical trial (preferred)</li><li>• Systemic therapy</li><li>• Supportive care</li></ul>

an option for people who can't have systemic therapy.

## Supportive care

Cancer treatment is too harsh for some people. In this case, NCCN advises receiving supportive care. Supportive care aims to improve your quality of life. One of its aims is to treat symptoms caused by cancer. Talk with your team about supportive care to get the best care plan for you. More information on supportive care is in *Chapter 4: Supportive care for cancer complications*.

## What's next?

It's common to have many concerns about cancer. Your care team will support you. More sources of support are listed in *Chapter 8: Other resources*.

## Key points

- Pancreatic cancer may be treated with surgery if there are no clear signs of metastases. Also, it must be very likely that surgery can safely remove all the cancer.
- Resectable pancreatic cancer can be surgically removed but first may be treated with chemotherapy. Borderline resectable pancreatic cancer must be treated first with chemotherapy to shrink it for surgery. Some people receive chemoradiation after chemotherapy.

- There are 3 main types of pancreatic surgery. A pancreatoduodenectomy (Whipple procedure) and distal pancreatectomy remove part of the pancreas. A total pancreatectomy removes the entire pancreas. Which surgery you receive will depend on where the cancer is in the pancreas.
- If your surgeon is unable to remove the tumor, procedures to prevent or relieve symptoms may be done instead.
- After pancreatic surgery, you may receive more treatment to kill any cancer cells that remain in your body. Chemotherapy and chemoradiation are options.
- When cancer treatment is finished, follow-up care is started. Your care team will check for signs of the cancer returning. You'll also receive care for side effects and help to live a healthy life.

## Questions to ask

- Will I receive neoadjuvant therapy, adjuvant therapy, or both?
- What type of surgery makes the most sense for me?
- How long will I need to be in the hospital for surgery?
- How long is recovery after the surgery?
- What happens during follow-up care?

# 8

## Other resources

- 59 What else to know
- 59 What else to do
- 59 Where to get help
- 60 Questions to ask

**Want to learn more? Here's how you can get additional help.**

## What else to know

This book can help you improve your cancer care. It plainly explains expert recommendations and suggests questions to ask your care team. But it's not the only resource that you have.

You're welcome to receive as much information and help as you need. Many people are interested in learning more about:

- The details of their health and treatment options
- Finding a care provider who specializes in pancreatic cancer
- Getting financial help
- Coping with health issues
- Making an advance care plan

## What else to do

Your health care center can help you with next steps. They often have on-site resources to help meet your needs and find answers to your questions. Your health care center may also inform you of resources in your community.

In addition to help from your providers, the resources listed in the next section provide support for many people like yourself. Look through the list and visit the provided websites to learn more about these organizations.

## Where to get help

### **AnCan Foundation**

[Ancan.org](https://Ancan.org)

### **Bone Marrow & Cancer Foundation**

[bonemarrow.org](https://bonemarrow.org)

### **CancerCare**

[Cancercare.org](https://Cancercare.org)

### **Cancer Hope Network**

[cancerhopenetwork.org](https://cancerhopenetwork.org)

### **FORCE: Facing Our Risk of Cancer Empowered**

[facingourrisk.org](https://facingourrisk.org)

### **GRACE**

[cancergrace.org](https://cancergrace.org)

### **Hirshberg Foundation for Pancreatic Cancer Research**

[pancreatic.org](https://pancreatic.org)

### **Imerman Angels**

[Imermanangels.org](https://Imermanangels.org)



**Lustgarten Foundation**

[lustgarten.org](http://lustgarten.org)

**My Faulty Gene**

[Myfaultygene.org](http://myfaultygene.org)

**National Coalition for Cancer Survivorship**

[Canceradvocacy.org](http://Canceradvocacy.org)

**Pancreatic Cancer Action Network  
(PanCAN)**

[PanCAN.org](http://PanCAN.org)

**TargetCancer Foundation**

[Targetcancer.org](http://Targetcancer.org)

**Triage Cancer**

[triagecancer.org](http://triagecancer.org)



**We want your  
feedback!**

Our goal is to provide helpful  
and easy-to-understand  
information on cancer.

Take our survey to let us know  
what we got right and what we  
could do better.

[NCCN.org/patients/feedback](http://NCCN.org/patients/feedback)

## Questions to ask

- How do I find a health care provider who's an expert in pancreatic cancer?
- What are the steps to get a second opinion?
- How much will I have to pay for my treatment and what help is available for these costs?
- How can I connect with others and build a support system?



## Words to know

### **adjuvant therapy**

Treatment that is given after the main treatment to lower the chances of the cancer returning.

### **anticoagulant**

A drug that slows down the time it takes for blood to clot.

### **bile duct**

A small tube-shaped structure that drains fluid called bile from the liver.

### **biliary bypass**

Surgery that re-routes the flow of bile into the small intestine.

### **biomarker**

Any molecule in your body that can be measured and shows a normal process, abnormal process, condition, or disease.

### **biopsy**

A procedure that removes tissue or fluid samples to be tested for disease.

### **borderline resectable pancreatic cancer**

Pancreatic cancer that has minor involvement with nearby parts of the body such as blood vessels.

### **CA 19-9**

A protein made by some types of cancer and found in blood. High CA 19-9 levels in the blood are a tumor marker of pancreatic cancer.

### **cancer stage**

A rating of the outlook of a cancer based on its growth and spread.

### **celiac plexus neurolysis**

Injection of a nerve block into a nerve bundle called the celiac plexus.

### **chemoradiation**

Treatment that combines chemotherapy and radiation therapy.

### **chemotherapy**

Treatment with cancer drugs that kills fast-growing cells.

### **common bile duct**

A tiny tube that carries a fluid called bile from the liver into the intestine.

### **computed tomography (CT)**

A test that uses x-rays from many angles to make a picture of the inside of the body.

### **contrast**

A substance put into your body to make clearer pictures during imaging tests.

### **distal pancreatectomy**

Surgery that removes the widest part (body) and narrow end (tail) of the pancreas as well as other nearby organs.

### **ECOG**

Eastern Cooperative Oncology Group

### **endoscopic retrograde cholangiopancreatography (ERCP)**

A procedure that uses x-rays and a medical device that is guided down the throat.

### **endoscopic ultrasound (EUS)**

A procedure that takes detailed pictures inside the body with a device guided down the throat.

**first-line therapy**

The first treatment given to treat a disease. Might be followed by second-line or more lines of treatment.

**gastrojejunostomy**

Surgery to bypass a blocked stomach.

**GI**

gastrointestinal

**hereditary pancreatic cancer**

Cancer in a person who had an inherited high risk of getting the cancer.

**high-volume center**

A care center that treats a large number of people with cancer each year.

**immunotherapy**

A drug treatment that helps the body's immune system find and destroy cancer cells.

**jaundice**

Yellowing of the skin and eyes due to a buildup of bilirubin in the body.

**jejunostomy tube (J-tube)**

A feeding tube that is inserted through the skin into the small intestine.

**laparoscopy**

A procedure that inserts thin tools through small cuts to do work inside the belly area.

**liver function test**

A lab test on a blood sample that measures chemicals made or processed by the liver.

**locally advanced pancreatic cancer**

Pancreatic cancer that has major involvement with nearby parts of the body such as blood vessels.

**LMWH**

Low-molecular-weight heparin

**magnetic resonance****cholangiopancreatography (MRCP)**

A test that uses radio waves and powerful magnets to make very clear pictures of the pancreas and bile ducts.

**magnetic resonance imaging (MRI)**

A test that uses radio waves and powerful magnets to make pictures of the insides of the body.

**medical oncologist**

A doctor who is an expert in cancer drugs.

**metastasis**

The spread of cancer from the place where it started to another part of the body.

**neoadjuvant therapy**

A treatment that is given before the main treatment to reduce cancer.

**pancreatic protocol**

Methods of imaging that improve pictures of the pancreas.

**pancreatoduodenectomy**

Surgery to remove the widest part (head) of the pancreas and parts of other nearby organs. Also called Whipple procedure.

**pathologist**

A doctor who is an expert in testing cells and tissue to find disease.

**PDAC**

pancreatic ductal adenocarcinoma

**percutaneous endoscopic gastrostomy (PEG) tube**

A feeding tube that is inserted through a cut in the abdomen and into the stomach. Also called gastrostomy tube (G-tube).

**performance status**

A rating of a person's overall health and ability to do daily activities.

**positron emission tomography (PET)**

A test that uses radioactive material to show the shape and function of tissue.

**radiation therapy**

The use of high-energy rays to destroy cancer cells.

**recurrence**

The return of cancer after treatment.

**regimen**

A plan that defines the dosage, schedule, and duration of a treatment.

**resectable pancreatic cancer**

Cancer that can be completely removed with surgery.

**second-line therapy**

The second treatment given when the first treatment does not work or stops working.

**stent**

A small tube-shaped, expandable device.

**stereotactic body radiation therapy (SBRT)**

Treatment with high-dose radiation to smaller areas over 1 to 5 sessions.

**supportive care**

Cancer care given to improve quality of life. Also called palliative care.

**surveillance**

Ongoing testing to watch for cancer growth when not receiving cancer treatment.

**systemic therapy**

A drug treatment that travels in the bloodstream to reach cancer wherever it is.

**total pancreatectomy**

Surgery to remove the entire pancreas and other nearby organs and tissues.

**targeted therapy**

A drug treatment that identifies and kills certain kinds of cancer cells.

**Whipple procedure**

Surgery to remove the head of the pancreas and parts of other nearby organs. Also called pancreatoduodenectomy.

# NCCN Contributors

This patient guide is based on the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Pancreatic Adenocarcinoma, Version 2.2025 — February 3, 2025. It was adapted, reviewed, and published with help from the following people:

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# NCCN Cancer Centers

**Abramson Cancer Center**  
at the University of Pennsylvania  
Philadelphia, Pennsylvania  
800.789.7366 • [pennmedicine.org/cancer](http://pennmedicine.org/cancer)

**Case Comprehensive Cancer Center/**  
**University Hospitals Seidman Cancer Center and**  
**Cleveland Clinic Taussig Cancer Institute**  
Cleveland, Ohio  
UH Seidman Cancer Center  
800.641.2422 • [uhhospitals.org/services/cancer-services](http://uhhospitals.org/services/cancer-services)  
CC Taussig Cancer Institute  
866.223.8100 • [my.clevelandclinic.org/departments/cancer](http://my.clevelandclinic.org/departments/cancer)  
Case CCC  
216.844.8797 • [case.edu/cancer](http://case.edu/cancer)

**City of Hope National Medical Center**  
Duarte, California  
800.826.4673 • [cityofhope.org](http://cityofhope.org)

**Dana-Farber/Brigham and Women's Cancer Center |**  
**Mass General Cancer Center**  
Boston, Massachusetts  
877.442.3324 • [youhaveus.org](http://youhaveus.org)  
617.726.5130 • [massgeneral.org/cancer-center](http://massgeneral.org/cancer-center)

**Duke Cancer Institute**  
Durham, North Carolina  
888.275.3853 • [dukecancerinstitute.org](http://dukecancerinstitute.org)

**Fox Chase Cancer Center**  
Philadelphia, Pennsylvania  
888.369.2427 • [foxchase.org](http://foxchase.org)

**Fred & Pamela Buffett Cancer Center**  
Omaha, Nebraska  
402.559.5600 • [unmc.edu/cancercenter](http://unmc.edu/cancercenter)

**Fred Hutchinson Cancer Center**  
Seattle, Washington  
206.667.5000 • [fredhutch.org](http://fredhutch.org)

**Huntsman Cancer Institute at the University of Utah**  
Salt Lake City, Utah  
800.824.2073 • [healthcare.utah.edu/huntsmancancerinstitute](http://healthcare.utah.edu/huntsmancancerinstitute)

**Indiana University Melvin and Bren Simon**  
**Comprehensive Cancer Center**  
Indianapolis, Indiana  
888.600.4822 • [www.cancer.iu.edu](http://www.cancer.iu.edu)

**Johns Hopkins Kimmel Cancer Center**  
Baltimore, Maryland  
410.955.8964  
[www.hopkinskimmelcancercenter.org](http://www.hopkinskimmelcancercenter.org)

**Mayo Clinic Comprehensive Cancer Center**  
Phoenix/Scottsdale, Arizona  
Jacksonville, Florida  
Rochester, Minnesota  
480.301.8000 • Arizona  
904.953.0853 • Florida  
507.538.3270 • Minnesota  
[mayoclinic.org/cancercenter](http://mayoclinic.org/cancercenter)

**Memorial Sloan Kettering Cancer Center**  
New York, New York  
800.525.2225 • [mskcc.org](http://mskcc.org)

**Moffitt Cancer Center**  
Tampa, Florida  
888.663.3488 • [moffitt.org](http://moffitt.org)

**O'Neal Comprehensive Cancer Center at UAB**  
Birmingham, Alabama  
800.822.0933 • [uab.edu/onealcancercenter](http://uab.edu/onealcancercenter)

**Robert H. Lurie Comprehensive Cancer Center of**  
**Northwestern University**  
Chicago, Illinois  
866.587.4322 • [cancer.northwestern.edu](http://cancer.northwestern.edu)

**Roswell Park Comprehensive Cancer Center**  
Buffalo, New York  
877.275.7724 • [roswellpark.org](http://roswellpark.org)

**Siteman Cancer Center at Barnes-Jewish Hospital**  
**and Washington University School of Medicine**  
St. Louis, Missouri  
800.600.3606 • [siteman.wustl.edu](http://siteman.wustl.edu)

**St. Jude Children's Research Hospital/**  
**The University of Tennessee Health Science Center**  
Memphis, Tennessee  
866.278.5833 • [stjude.org](http://stjude.org)  
901.448.5500 • [uthsc.edu](http://uthsc.edu)

**Stanford Cancer Institute**  
Stanford, California  
877.668.7535 • [cancer.stanford.edu](http://cancer.stanford.edu)

**The Ohio State University Comprehensive Cancer Center -**  
**James Cancer Hospital and Solove Research Institute**  
Columbus, Ohio  
800.293.5066 • [cancer.osu.edu](http://cancer.osu.edu)

**The UChicago Medicine Comprehensive Cancer Center**  
Chicago, Illinois  
773.702.1000 • [uchicagomedicine.org/cancer](http://uchicagomedicine.org/cancer)

**The University of Texas MD Anderson Cancer Center**  
Houston, Texas  
844.269.5922 • [mdanderson.org](http://mdanderson.org)



UC Davis Comprehensive Cancer Center  
Sacramento, California  
916.734.5959 • 800.770.9261  
[health.ucdavis.edu/cancer](http://health.ucdavis.edu/cancer)

UC San Diego Moores Cancer Center  
La Jolla, California  
858.822.6100 • [cancer.ucsd.edu](http://cancer.ucsd.edu)

UCLA Jonsson Comprehensive Cancer Center  
Los Angeles, California  
310.825.5268 • [uclahealth.org/cancer](http://uclahealth.org/cancer)

UCSF Helen Diller Family  
Comprehensive Cancer Center  
San Francisco, California  
800.689.8273 • [cancer.ucsf.edu](http://cancer.ucsf.edu)

University of Colorado Cancer Center  
Aurora, Colorado  
720.848.0300 • [coloradocancercenter.org](http://coloradocancercenter.org)

University of Michigan Rogel Cancer Center  
Ann Arbor, Michigan  
800.865.1125 • [rogelcancercenter.org](http://rogelcancercenter.org)

University of Wisconsin Carbone Cancer Center  
Madison, Wisconsin  
608.265.1700 • [uwhealth.org/cancer](http://uwhealth.org/cancer)

UT Southwestern Simmons  
Comprehensive Cancer Center  
Dallas, Texas  
214.648.3111 • [utsouthwestern.edu/simmons](http://utsouthwestern.edu/simmons)

Vanderbilt-Ingram Cancer Center  
Nashville, Tennessee  
877.936.8422 • [vicc.org](http://vicc.org)

Yale Cancer Center/Smilow Cancer Hospital  
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855.4.SMILOW • [yalecancercenter.org](http://yalecancercenter.org)



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# Index

- adjuvant therapy 53–54
- bile duct 9, 12–13, 27–28, 51–53
- biomarker testing 16, 40–41, 44, 46
- biopsy 13–14, 55
- borderline resectable pancreatic cancer 35, 49
- CA 19-9 13, 16, 50, 53, 55
- cancer stage 11, 13–14, 34
- chemoradiation 25, 38, 42, 49, 54, 56
- chemotherapy 20–22, 25, 29, 30, 38–43, 45, 46, 49, 53, 54, 56
- clinical trial 19, 20, 38, 42, 49, 54, 55
- computed tomography (CT) 11, 12, 14, 50, 53, 55
- distal pancreatectomy 51
- endoscopic retrograde  
cholangiopancreatography (ERCP) 13, 14, 28
- endoscopic ultrasound 12, 13, 14, 30
- first-line therapy 39, 41
- gastrojejunostomy 29, 53
- immunotherapy 23, 38, 40, 41, 45, 46
- jaundice 9, 28, 53
- laparoscopy 13
- liver function test 13
- locally advanced pancreatic cancer 35, 38
- magnetic resonance imaging (MRI) 11, 12, 50, 55
- medical oncologist 20
- neoadjuvant therapy 49, 50
- pancreatic protocol 11, 50
- pancreatoduodenectomy 51
- pathologist 13
- performance status 35, 37–42, 44–46
- positron emission tomography (PET) 12, 50
- radiation therapy 10, 24, 25, 30, 31, 38, 53, 56
- recurrence 56
- resectable pancreatic cancer 35, 49
- stereotactic body radiation therapy (SBRT) 24, 38, 42, 56
- supportive care 6, 26–31, 38, 42, 57
- surveillance 55
- systemic therapy 34, 38, 39, 42, 44, 49, 56
- targeted therapy 22–23
- total pancreatectomy 51–52
- Whipple procedure 51





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