National Comprehensive Cancer Network®

2026

NCCN Guidelines for Patients®

Cancer care recommendations from leading experts at the National Comprehensive Cancer Network® (NCCN®)

Pleural Mesothelioma



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NCCN Guidelines for Patients®

The essential guide for people facing cancer.

Based on care recommendations from leading cancer experts.

Explains high-quality cancer care provided at state-of-the-art cancer centers.

Reviewed and revised every year.

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®).

Because cancer care is always evolving, NCCN develops and frequently updates evidence-based cancer care recommendations used by health care providers worldwide. These recommendations are known as the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®).

The NCCN Guidelines for Patients plainly explain these expert recommendations, so you can talk with your care team about the best care for you.

These NCCN Guidelines for Patients are based on the NCCN Guidelines® for Mesothelioma: Pleural, Version 2.2026 — October 3, 2025.

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About pleural mesothelioma

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Learning you have mesothelioma can be frightening and overwhelming. Mesothelioma is a cancer that's challenging to treat. This guide describes the best options for treatment to help you make well-informed decisions.

What is pleural mesothelioma?

Pleural mesothelioma is a cancer that develops in the thin layers of tissue that surround the lungs.

The term pleural mesothelioma requires more explanation, though. Let's break the name down to figure out exactly what it means.

Pleural – This word refers to the pleura that surrounds each lung. The pleura is 2 thin layers of membrane, called mesothelium, that's supported by connective tissue. Fluid between the layers lets them slide easily against one another during breathing.

Mesothelioma – This word means a cancer of cells from the mesothelium. Cancer cells grow out of control and may become a tumor. They also may spread to other areas of the body.

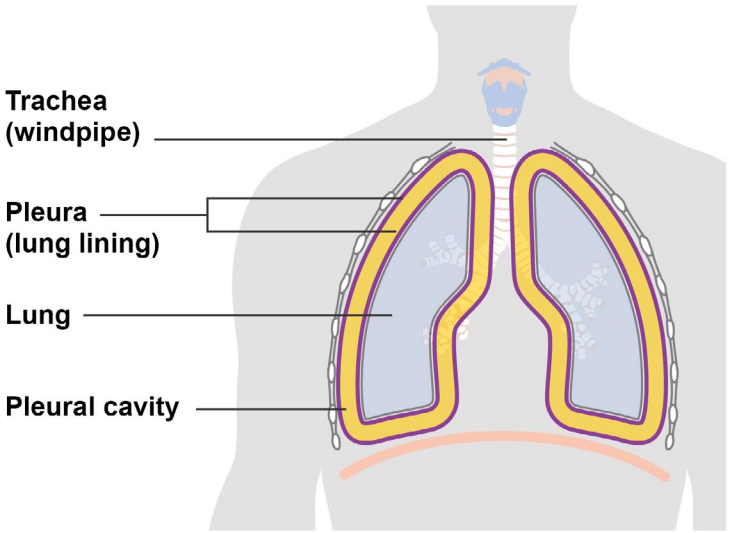
The pleural mesothelium is not the only mesothelium in the body. There are other areas of mesothelium, so there are other types of mesothelioma. Pleural mesothelioma is the most common type.

From this point on, we'll refer to pleural mesothelioma in this guide simply as mesothelioma.

The pleura

The pleura is made of 2 layers of mesothelium tissue. The inner layer (the visceral pleura) covers the lung. The outer layer (the parietal pleura) lines the inside of the chest wall. Between the layers is a narrow space called the pleural cavity that's filled with fluid.

Credit: Cancer Research UK, CC BY-SA 4.0, via Wikimedia Commons



How is mesothelioma found?

Mesothelioma is usually found after a person develops certain symptoms. Some common symptoms are shortness of breath, chest wall pain, fever, extreme tiredness, and unexplained weight loss.

Diagnosing mesothelioma can be a lengthy and worrisome experience. Because mesothelioma is rare, it can be mistaken for other conditions that are more common.

Mesothelioma is also difficult to distinguish from other cancers. That's why your care team will request several tests to learn about the cancer you have.

The tests needed to confirm mesothelioma and to plan treatment are discussed in *Chapter 2: Testing for mesothelioma*.

How is mesothelioma treated?

The most common treatment for mesothelioma is prescription drugs called systemic therapy. These drugs treat cancer throughout the body, including cancer in hard-to-reach places and in many places. Treatment may continue, off and on, for the rest of your life.

There's no single treatment plan that's best for everyone. For example, some people don't start treatment right away. Also, systemic therapy differs between people, and other types of treatments may be added to systemic therapy to improve results. Learn about your treatment options in *Chapter 3: Treating mesothelioma*.

People with mesothelioma face many challenges. They often have distressing symptoms from the cancer and treatment. Many also have spiritual, emotional, and social concerns.

It's important to tell your team about the challenges you face and get the supportive care you need. More information is in *Chapter 4: Improving life with supportive care*.

"I think the absolute best thing you can do as a mesothelioma patient is seek out the oncologists who specialize in this field. Pick their brains, ask questions, ask more questions, and get comfortable with their expertise leading the plan. Stay involved and on top of the treatments and breaking news."

How can I get the best care?

Advocate for yourself. You have an important role to play in your care. Many people feel more satisfied when they actively take part in planning their cancer care.

The NCCN Guidelines for Patients will help you play a larger role in your care. Discuss the recommendations in this guide with your care team. Ask questions about your options and share your goals and concerns.

Don't know what to ask? You're not alone. That's why we include suggested questions to ask at the end of chapters.

Keep reading to find the best care for you.

How this guide can help you

Making decisions about cancer care is stressful. There's a lot to learn, and you don't know what the future holds.

Use this guide to get the information and support you need.

Patients, doctors, and other health care professionals trust the NCCN Guidelines for Patients. This guide uses clear, everyday language to explain current cancer care recommendations made by respected experts in the field. Their recommendations are based on the latest research and practices at leading cancer centers.

Your health is unique to you, so your cancer care should be, too. As you read this guide, you'll learn which treatments are likely to provide the best results for you. And you'll be better prepared to talk with your care team.

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Several tests are used to identify mesothelioma and plan treatment. Imaging scans show where cancer likely is in the body, and lab tests on tissue samples provide details about the cancer.

This chapter explains why your health care provider may suspect you have mesothelioma and the tests used to confirm the diagnosis. After diagnosis, other tests are needed to learn more about the cancer. Your cancer care team should also screen for factors related to where you live that might affect your treatment results.

Reasons to suspect mesothelioma

Asbestos is the main cause of mesothelioma. Asbestos is a group of naturally occurring minerals that have been widely used in construction and commercial materials. Most people with mesothelioma have been around or worked with asbestos.

Yet some people with mesothelioma haven't had any contact with asbestos that they're aware of. This suggests that there are other causes of mesothelioma.

Your team will suspect mesothelioma if you have pleural effusion or thickening. These conditions are described next.

How asbestos is linked to mesothelioma

Asbestos can break into tiny pieces that can become airborne. These particles can be inhaled or even swallowed.

In the lungs, some of the fibers travel to the lining of the lungs called the pleura. Asbestos irritates the pleural tissue and causes swelling and scarring.

Many scientists think asbestos causes changes in pleural cells, which result in cancer.

These changes don't happen quickly. Mesothelioma develops over many years, even decades.

Pleural effusion

Fluid that builds up around the lung is called pleural effusion. This excess fluid puts pressure on the lungs, making it more difficult to breathe. Other symptoms of pleural effusion are cough and chest pain.

Pleural effusion is often the earliest sign of asbestos-related disease. However, not everyone who has pleural effusion will have mesothelioma.

Pleural thickening

Pleural thickening is what happens when there's widespread scarring of the pleural tissue. Asbestos is one cause of pleural thickening. Over time, the irritation and inflammation caused by asbestos in the pleura creates scar tissue.

Increased scar tissue leads to thickening of the pleural layers, which can restrict the movement of the lungs. A person whose lungs can't fully expand can have a feeling of breathlessness. Other symptoms are chest pain and cough.

Confirming mesothelioma

Several steps are required to reach a final diagnosis of mesothelioma. The first steps are to examine your general health and to evaluate your symptoms.

Health history

Your team needs to have all of your health information. They'll ask you about health issues and treatments you've had.

Mesothelioma mainly occurs in people who've been exposed to asbestos. You'll be asked whether you've worked with asbestos or lived with someone who worked with asbestos.

Physical exam

Your doctor will also perform a thorough physical exam of your body. They will look for any signs of cancer and assess your overall health.

CT scan of the chest

If your symptoms suggest mesothelioma, you'll need to have CT (computed tomography) of the chest. A CT scan creates images of the insides of the body. It's a more detailed kind of x-ray.

CT scan

A CT scanner is a large machine with a tunnel in the middle. During the scan, you'll lie on a table that moves slowly through the tunnel. The machine scans your chest with x-rays and produces images that can show signs of cancer.



You'll receive an injection of contrast if it's safe for you. Contrast is a substance that makes images clearer.

After the scan, a thoracic radiologist will study your images. A thoracic radiologist is an expert in reading images of the inside of the chest.

A CT scan can show if you have pleural effusion or pleural thickening. It can also detect tumors. Your team will see the location and size of the tumors.

Blood test

Mesothelioma cells may release molecules called soluble mesothelin-related peptides into the bloodstream. Although not done often, a sample of your blood may be tested for these molecules to help with diagnosis.

Biopsy of pleural fluid or tissue

A biopsy is a procedure that removes a small amount of fluid or tissue for testing. If your CT scan shows excess pleural fluid or a mass, your team will want to take a sample of the tissue or fluid.

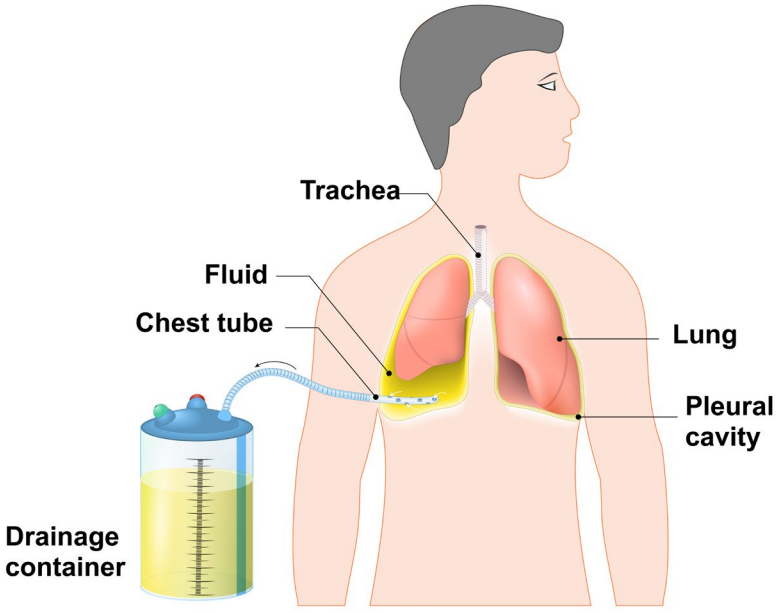
Tissue biopsy

A pleural biopsy is when samples of pleural tissue are removed. A pleural biopsy can be done in several ways:

- A **thoracoscopic biopsy** removes tissue with medical tools inserted through small cuts made in the chest. A thoracoscopic biopsy is preferred over other methods.
- An **image-guided core biopsy** uses a CT scan or an ultrasound to guide a needle through your skin and into a tumor. The needle will remove samples of tissue.
- An **open biopsy** involves making a large cut into your chest through which the surgeon can see and remove tissue.

Fluid biopsy

Thoracentesis is a procedure for removing a sample of fluid from the pleural cavity.



Fluid biopsy

Taking fluid out of the pleural space is called a thoracentesis. After your skin is cleaned and numbed, a needle will be inserted between your ribs into your chest to get the fluid. Many times, no cancer cells are seen in the fluid even though a person has mesothelioma.

Lab tests

The biopsy samples will be sent to a lab for testing by a pathologist. A pathologist is a doctor who's an expert in tissues and cells and confirming cancer.

Because mesothelioma is hard to identify, several tests will be done:

- The pathologist will use a microscope to examine the biopsy samples. The size, shape, and structure of the cells can tell the pathologist whether there is cancer and its outlook (prognosis).
- The pathologist will use a lab method called immunohistochemistry to identify the type of cancer. Immunohistochemistry helps tell if a cancer is mesothelioma versus another cancer, such as lung cancer.
- Cytogenetic and molecular testing looks for abnormal changes in the genes of cells. These tests can lead to a more precise prognosis and help guide therapy.

The results of lab tests used for diagnosis are recorded in a pathology report.

Types of mesothelioma

Mesothelioma affects more than one type of pleural cell. Knowing the cell type of your cancer is important because treatment options may differ.

- **Epithelioid** is the most common subtype of mesothelioma. Epithelioid cells are uniform and arranged in organized patterns.
- **Sarcomatoid** is the least common subtype. Sarcomatoid cells are rod shaped and found in disorganized patterns.
- The **biphasic** subtype has a mix of epithelioid cells and sarcomatoid cells.

Planning treatment

Your team will plan treatment using the tests already described and the tests in this section. A list of common tests for mesothelioma is in **Guide 1**.

Guide 1
Common tests for mesothelioma

CT scans of chest and abdomen
Thoracentesis and pleural biopsy
Review of biopsy by pathologist, immunohistochemistry, and molecular testing
Performance status evaluation

CT scan for cancer staging

Your team will need to know how far the mesothelioma has grown and spread in your body. This is called cancer staging. A CT scan of your chest and abdomen is needed. Contrast should be used if it's safe for you.

After the scan, your team will decide the cancer stage. A cancer stage is a number that stands for the extent of cancer in the body. The stages of mesothelioma range from 1 to 4. A lower number means the cancer has grown less, and a higher number means it has grown more.

Performance status

Performance status is your ability to do day-to-day activities. It's based on your health history and physical exam. Your team will use your performance status to decide if your body can endure intense treatment.

Evaluation for surgery

Surgery to remove the cancer is sometimes used to treat stage 1 epithelioid mesothelioma. If surgery may be an option, you'll need additional tests.

Heart and lung tests

Your heart and lungs need to be healthy enough for surgery. Pulmonary function tests show how well your lungs are working. A cardiac stress test measures how well your heart works during exercise.

PET/CT and MRI scans

You'll have more scans to assess if the cancer has spread.

PET (positron emission tomography) combined with a CT scan is necessary. PET uses a sugar radiotracer to highlight tissue in your body that may be cancer.

You may have an MRI (magnetic resonance imaging) scan with contrast of the chest as well. MRI uses a safe magnetic field and radio waves to make images.

Biopsy of lymph nodes

When mesothelioma spreads, it usually travels to tiny structures, called lymph nodes, between your lungs. Your care team will biopsy these nodes using a thin tube, called a scope, that has a camera. The scope is guided down your throat or through a small cut into your body.

Additional biopsies

Other biopsies may be done if your team suspects cancer has spread to the other side of the chest or to your abdomen.

Your team will biopsy inside of your chest using video-assisted thoracoscopic surgery, known as VATS.

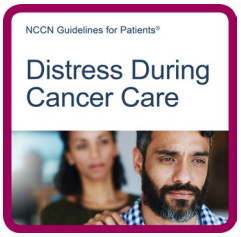
To biopsy inside of your abdomen, laparoscopy is needed.

Social and practical concerns

Your health can be affected by where you live and work, your income, and your responsibilities, just to name a few social factors. Getting help for social needs can lead to a longer life and better quality of life.

NCCN has a quick-and-easy tool that helps people with cancer tell their care team about their concerns. This screening tool is called the NCCN Distress Thermometer and Problem List. The Problem List includes many areas of concern, including social and practical ones, that you can check off.

The NCCN Distress Thermometer and Problem List can be found in *NCCN Guidelines for Patients: Distress During Cancer Care*, available at NCCN.org/patientguidelines and on the NCCN Patient Guides for Cancer app.



Key points

- Excess fluid and scar tissue in the pleura are possible signs of mesothelioma.
- A CT scan can show if there are tumors and where they are located.
- To confirm mesothelioma, a sample of pleural fluid or tissue must be removed from your body and tested.
- The types of mesothelioma are epithelioid, sarcomatoid, and biphasic.
- Your care team will plan treatment based on the cancer type and stage as well as other factors.
- Getting help for social and practical needs may improve your health.

Questions to ask

- Do the tests for mesothelioma have any risks?
- Will I need to pay any costs for the tests?
- How can I get a copy of the test results?
- What do I need to do to prepare for testing?
- Who can assist me with getting help for social and practical needs?

What's next?

Your team will explain the test results to you and what they recommend for your care.

The next chapter explains NCCN recommendations for treatment based on your overall health and features of mesothelioma.

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Treating mesothelioma

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Treatment for mesothelioma varies from person to person. Your care team will work with you to plan the best treatment. Systemic therapy is central to treatment. It treats mesothelioma wherever it is in the body.

This chapter explains some important factors care teams consider when planning treatment. You'll learn about your treatment options and how to get early access to potential new treatments.

A team approach to care

NCCN recommends that a multidisciplinary team manage treatment of mesothelioma.

A multidisciplinary team is made up of specialists from different fields of medicine. By working together, the team brings the best knowledge from all sides to plan the best treatment.

Each member of your multidisciplinary team should have experience with mesothelioma, if possible.

Your team may include these experts:

- A **medical oncologist** treats cancer with drugs.
- A **radiation oncologist** treats cancer with radiation.
- A **thoracic surgeon** removes cancer from the chest during an operation.
- A **diagnostic imaging specialist** interprets medical images to identify and monitor diseases.
- A **pulmonologist** is an expert in lung diseases.

Many people also have team members who provide supportive care, which is discussed in *Chapter 4: Improving life with supportive care*.

You're an important part of the team. Your input will help shape your treatment plan.

Options for initial treatment

Your team will assess which mesothelioma treatments are options for you. They will plan treatment based on many factors, including your overall health.

Options by performance status

First, your team will assess if you are healthy enough to have cancer treatment. Treatment of mesothelioma can be tough on the body.

Your performance status may suggest that cancer treatment may not be safe for you. In this case, NCCN recommends receiving supportive care.

Goals of supportive care can be adapted to your needs. They could include symptom relief, better quality of life, fewer health crises, and a longer life. More information is in *Chapter 4: Improving life with supportive care*.

If cancer treatment is likely safe, you may receive supportive care in addition to treatment.

Options by cancer type and stage

For people who are fairly healthy, NCCN recommendations for treatment are based on the types and stages of mesothelioma.

The main approaches to treatment for all mesotheliomas are:

- Whole-body drug treatment called systemic therapy
- A watch-and-wait phase called observation then, if needed, systemic therapy

Treatment of stage 1 epithelioid mesothelioma has more options. Stage 1 is the earliest stage of the disease. The cancer is small and is on one side of the chest.

- Your team may add intensity-modulated radiation therapy (IMRT) to systemic therapy.
- Surgery may be an option, but its benefits are unclear. There aren't any data that show it prolongs life when added to systemic therapy.

“There’s more hope now than there ever was. So don’t give up. When hope is in the equation, the odds don’t matter."

Starting with observation

Because mesothelioma takes decades to develop, it may continue to grow very slowly after it has been found. Also called watchful waiting, observation is a period of testing to see if the cancer worsens. It’s an option when the cancer isn’t causing symptoms and has little impact on your life.

During observation, you’ll see your care team often. You won’t receive any treatment unless you begin to have symptoms or until a scan shows the mesothelioma is growing.

What is systemic therapy?

Systemic therapy consists of prescription drugs that treat cancer throughout the body.

What to expect

Your medical oncologist will prescribe a regimen for you. A regimen consists of one or more drugs taken at a specific dose, schedule, and length of time.

You'll need to go to a health care center to receive systemic therapy. It’s given by injection. Often, the injection is a slow drip into a vein called an infusion. The drugs travel in the bloodstream to reach cancer cells throughout the body.

Systemic therapy is given in cycles of treatment days, followed by rest days. One cycle typically lasts for several weeks.

NCCN levels of preference

The next sections discuss regimens for mesothelioma. All the regimens are recommended and appropriate. NCCN experts also assign a level of preference to their recommendations for systemic therapies:

- **Preferred therapies** have the most evidence they may work better and be safer than other therapies.
- **Other recommended therapies** can provide effective results but may have less evidence, more side effects, or may not work quite as well as preferred therapies.
- **Therapies used in certain cases** work best for individuals with specific cancer features or health circumstances.

First-line systemic therapy

The first regimen you'll receive is referred to as first-line systemic therapy. It's often a chemotherapy-based regimen or a combination of immune checkpoint inhibitors.

A list of regimens for epithelioid mesothelioma is in **Guide 2**, and regimens for sarcomatoid or biphasic mesothelioma can be found in **Guide 3**.

Guide 2
First-line therapy for epithelioid mesothelioma

Preferred therapies	**Chemotherapy-based therapy** • Carboplatin, Pemetrexed • Carboplatin, Pemetrexed plus Bevacizumab • Carboplatin, Pemetrexed plus Pembrolizumab • Cisplatin, Pemetrexed • Cisplatin, Pemetrexed plus Bevacizumab • Cisplatin, Pemetrexed plus Pembrolizumab **Immune checkpoint inhibitors** • Ipilimumab plus Nivolumab
Therapies used in certain cases	**Chemotherapy** • Carboplatin, Gemcitabine • Cisplatin, Gemcitabine • Pemetrexed • Vinorelbine

Platinum-doublet chemotherapy

Chemotherapy kills fast-growing cells, including cancer cells. Platinum chemotherapies contain the metal platinum. Platinum-doublet chemotherapy consists of a platinum drug and another drug that works differently. It's commonly used for treatment.

Platinum chemotherapies are carboplatin (Kyxata) and cisplatin. These drugs are usually combined with pemetrexed (Alimta, Pemrydi RTU, Axtle, Pemfexy). But gemcitabine (Avgemsi) is sometimes used instead.

Platinum-doublet chemotherapy with bevacizumab

Bevacizumab (Avastin) is a type of drug called a VEGF antibody. It blocks a protein called VEGF, which stops the growth of blood vessels on tumors. Without blood, cancer cells die.

- For epithelioid mesothelioma, platinum-doublet chemotherapy with bevacizumab is one of the preferred options.
- For sarcomatoid or biphasic mesothelioma, platinum-doublet chemotherapy with bevacizumab is an option for other recommended therapies.

An FDA-approved biosimilar can be taken instead of bevacizumab. A biosimilar is almost an identical drug made by another company.

Guide 3
First-line therapy for sarcomatoid or biphasic mesothelioma

Preferred therapies	**Immune checkpoint inhibitors** • Ipilimumab plus Nivolumab **Chemotherapy-based therapies** • Carboplatin, Pemetrexed plus Pembrolizumab • Cisplatin, Pemetrexed plus Pembrolizumab
Other recommended therapies	**Chemotherapy-based therapies** • Carboplatin, Pemetrexed • Carboplatin, Pemetrexed plus Bevacizumab • Cisplatin, Pemetrexed • Cisplatin, Pemetrexed plus Bevacizumab
Therapies used in certain cases	**Chemotherapy** • Carboplatin, Gemcitabine • Cisplatin, Gemcitabine • Pemetrexed • Vinorelbine

Platinum-doublet chemotherapy with an immune checkpoint inhibitor

Immune checkpoint inhibitors restore the ability of immune T cells to kill cancer cells. Pembrolizumab (Keytruda) is an immune checkpoint inhibitor. Platinum-doublet chemotherapy plus pembrolizumab is a preferred regimen for all types of mesothelioma.

Combined immune checkpoint inhibitors

The combination of ipilimumab (Yervoy) and nivolumab (Opdivo) is also a preferred regimen for all types of mesothelioma. Both drugs are immune checkpoint inhibitors but work in different ways to kill cancer cells.

Single-agent chemotherapy

Pemetrexed is sometimes used by itself to treat mesothelioma. Another option is vinorelbine.

Radiation therapy for stage 1 epithelioid type

Systemic therapy with IMRT may be used to treat stage 1 epithelioid mesothelioma.

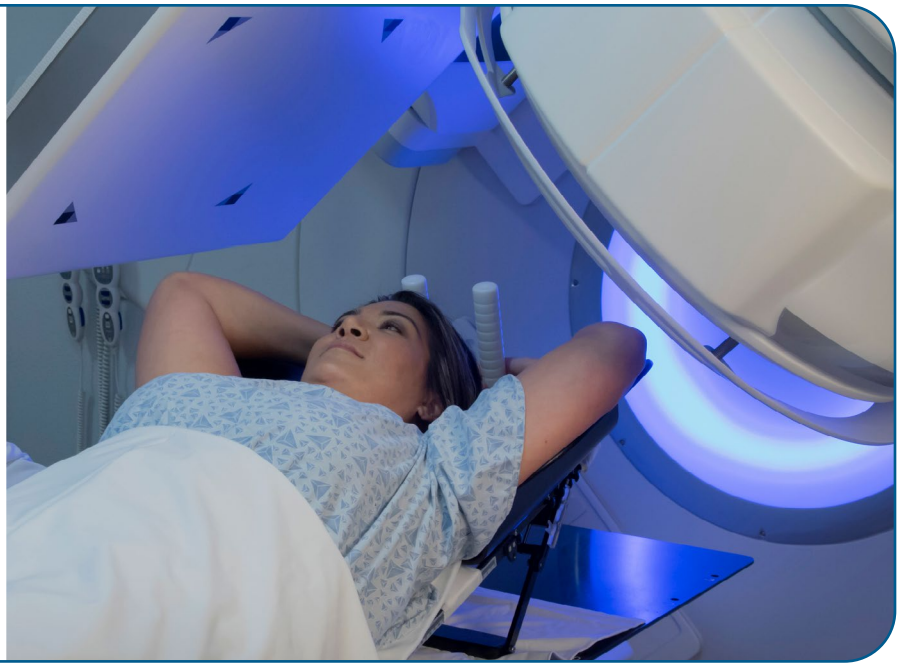
IMRT is a type of radiation therapy. It delivers x-ray beams that very closely match the shape of the tumor and spare more normal tissue around the tumor. The x-rays damage cancer cells, which either die or stop making new cancer cells.

During treatment, you'll be lying down on a table. A large machine makes the radiation beams and will aim the highest radiation dose at the tumor. Nearby tissue will receive a much lower dose.

A tumor in the chest is hard to target because it often moves when you breathe. To account for this challenge, your team will use advanced methods. You may need to hold your breath for 15 to 20 seconds at a time to better target the tumor.

What is radiation therapy?

Radiation therapy is the use of high-energy radiation to kill cancer cells.



Second-line systemic therapy

If the cancer grows during or after first-line therapy, another regimen may be started. This is called second-line systemic therapy. The goal of second-line therapy is to stop the growth of the cancer. Second-line options can be found in **Guide 4**.

Preferred therapies

Preferred second-line therapy is based on your prior treatment.

If you had chemotherapy, nivolumab with or without ipilimumab is the preferred therapy. Nivolumab with hyaluronidase-nvhy (Opdivo Qvantig) injections into the skin may be given instead of nivolumab infused into a vein unless you are also getting ipilimumab.

Some people have a second option after prior chemotherapy. If a regimen with pemetrexed stopped cancer growth before, a different regimen that includes pemetrexed may be given.

If you had ipilimumab plus nivolumab, platinum-doublet chemotherapy with or without bevacizumab is preferred.

Other recommended therapies

Other recommended therapies include gemcitabine with or without ramucirumab (Cyramza). Ramucirumab is a VEGF antibody. In addition to gemcitabine, vinorelbine and pemetrexed are options.

Guide 4
Second-line therapy for mesothelioma

Preferred therapies	**If you had chemotherapy, your options are:** • Ipilimumab plus Nivolumab • Nivolumab **If you had Ipilimumab plus Nivolumab, your options are:** • Carboplatin, Pemetrexed • Carboplatin, Pemetrexed plus Bevacizumab • Cisplatin, Pemetrexed • Cisplatin, Pemetrexed plus Bevacizumab
Other recommended therapies	**Chemotherapy-based therapy** • Pemetrexed • Gemcitabine • Gemcitabine plus Ramucirumab • Vinorelbine

A surgical approach to treatment

If you have stage 1 epithelioid mesothelioma, surgery with systemic therapy may be an option.

Systemic therapy

You may receive systemic therapy either before or after surgery. Systemic therapy before surgery may shrink the tumor and make surgery easier. Systemic therapy given after surgery is meant to kill any unseen cancer cells that were left behind.

Types of surgery

NCCN recommends having an operation by a surgeon who has experience with mesothelioma.

There are 2 types of surgery for mesothelioma:

- **Pleurectomy/decortication** removes the tumor and the pleura without removing the lung. Sometimes the pericardium (the lining around the heart) and part of the diaphragm are also removed.
- **Extrapleural pneumonectomy** removes both pleural layers and the lung. This procedure may also remove part of the diaphragm and often the pericardium.

Surgeons usually perform pleurectomy/decortication, but extrapleural pneumonectomy is sometimes done. Your team will consider a number of factors before recommending which operation is best for you. Sometimes, the surgeon has to begin operating first to see what's going on inside of your chest before deciding on the type of surgery.

The surgeon will also take samples of the lymph nodes between your lungs. This is done to find out if the cancer has spread outside of the pleura.

Radiation therapy after surgery

Some people receive IMRT after pleurectomy/decortication. IMRT may help you live longer by killing any cancer cells that weren't removed by surgery.

It can be difficult to give IMRT after surgery. IMRT may be an option at a treatment center that has experienced and trained staff.

What is a clinical trial?

A clinical trial is a type of medical research study. By joining a clinical trial, you may be able to receive tomorrow's cutting-edge treatment today.

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. 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 doctor 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.



Finding a clinical trial

In the United States

NCCN Cancer Centers
NCCN.org/cancercenters

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

Worldwide

The U.S. National Library of Medicine (NLM)
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

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.

Key points

- A multidisciplinary team will work with you to create a treatment plan. This plan will be based on many factors, including the type and stage of mesothelioma.
- Observation is a watch-and-wait strategy for people with slow-growing mesothelioma.
- Systemic therapy treats cancer wherever it is in the body. Chemotherapy, VEGF antibodies, and immune checkpoint inhibitors are types of systemic therapy.
- For stage 1 epithelioid mesothelioma, radiation therapy may used in addition to systemic therapy.
- Stage 1 epithelioid mesothelioma may be surgically removed and treated with systemic therapy. Radiation therapy is sometimes part of treatment.
- Clinical trials study new ways of fighting cancer in people. A clinical trial may be an option in addition to standard treatment.

Questions to ask

- Do I need to start treatment right away?
- How did you decide what treatment is best for me?
- What is the schedule, or cycles, of the systemic therapy?
- What are the common and serious side effects of my treatments?
- Is there a clinical trial that's a good fit for me?

What's next?

A care plan usually includes treatment for cancer and support for you. The next chapter explains what supportive care is and the ways it can help you.



Take our survey and help make the NCCN Guidelines for Patients better for everyone!

NCCN.org/patients/comments

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Improving life with supportive care

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The main concern for most people with cancer is to find treatment that works. Having cancer is not only about cancer treatment, though. Cancer care includes many additional challenges that may affect your life in unexpected ways.

There is a broad range of challenges among people with mesothelioma. Challenges may include starting a healthier lifestyle; treating cancer-related health conditions; and learning about end-of-life care, such as hospice.

This chapter addresses some of the challenges you may face and how supportive care can help.

What is supportive care?

Supportive care is an important part of cancer care. The goal is to improve your quality of life during and after cancer treatment. Supportive care is for everyone with cancer and their families, not just for those at the end of life.

Supportive care includes a wide range of services. Supportive care prevents or manages the symptoms of cancer and the side effects of cancer treatment, like pain and cancer-related fatigue. It also addresses the mental, social, emotional, and spiritual concerns faced by people with cancer.

Supportive care provides help with additional needs, such as:

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

Some health care professionals refer to palliative care as supportive care. They think these types of care are alike or overlap. Others think there are important differences, but both help people with cancer to live as well as they can. Your cancer center may have palliative care specialists, who can give you additional support and help coordinate your supportive care needs.

Help to quit smoking

Smoking can limit how well cancer treatment works. It also can worsen your overall health and how well your lungs work. Plus, it increases your risk for lung cancer.

- If you don’t smoke, it’s important that you don’t start now.
- If you do smoke, it is important to quit. It’s never too late.

Nicotine addiction is one of the hardest addictions to stop. The stress of having cancer may make it harder to quit.

The *NCCN Guidelines for Patients: Quitting Smoking* provides critical support and guidance for people with cancer. This guide explains how to best use the tools that exist to help you quit for good.

If you tried to quit before, try again. Most people slip or relapse before quitting for good.

Mesothelioma complications

People with mesothelioma often have health issues, called complications, caused by the cancer. Your care team will create a management plan based on your needs.

Pleural effusion

Pleural effusion is the buildup of extra fluid in the space between the pleural layers. This space is called the pleural cavity. The extra fluid can cause shortness of breath.

Pleural catheter

One treatment for pleural effusion is a pleural catheter. A pleural catheter is a thin, flexible tube that's placed in your chest. The catheter drains the buildup of fluid in the pleural cavity.

Talc pleurodesis

Another treatment for pleural effusion is talc pleurodesis. This treatment involves putting talc powder into the pleural cavity. The powder irritates the tissue and causes the two layers of pleura to fuse together while healing. This seals the pleural cavity and helps to stop fluid buildup.

Chest pain

Chest pain may be caused by cancer growing into the chest wall. Radiation therapy or heat or cold therapy (thermal ablation) may be used to ease chest pain. Pain medication and chemotherapy are other ways to manage chest pain.

Blockage by tumor

For some people, mesothelioma grows and causes a blockage (obstruction). For example, the cancer could block your airway. If this happens, radiation therapy may be used to shrink the tumor. Other less common treatment options are laser treatment or thermal ablation.

Common cancer effects

People with different types of cancer experience common health issues. Cancers share some common symptoms because they disrupt the body in similar ways. Treatment is similar for different cancers and causes common side effects.

Information on managing common effects can be found in the library of NCCN Guidelines for Patients. Guides from the supportive care series are briefly described next, so you can find the information you need.

Blood clots

Cancer can cause blood to thicken and form blood clots inside of blood vessels. This is called thromboembolic disease. 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. Read more about anticoagulants in *NCCN Guidelines for Patients: Blood Clots and Cancer*.

Distress

Everyone with cancer feels distressed at some point. It's normal to feel worried, sad, helpless, or angry. *NCCN Guidelines for Patients: Distress During Cancer Care* empowers people to get help for distress.

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. Read *NCCN Guidelines for Patients: Fatigue and Cancer* to learn about physical activity and other methods that reduce cancer-related fatigue.

Nausea and vomiting

Both chemotherapy and radiation therapy can cause nausea and vomiting. Nausea is the feeling that you are going to throw up. Vomiting is forcefully throwing up what's in your stomach. Treatments that prevent and manage both conditions are discussed in *NCCN Guidelines for Patients: Nausea and Vomiting*.

Low blood counts

Chemotherapy often causes a drop in blood cells. Depending on the type of blood cell affected, you may have fatigue, unusual bleeding, and more infections than usual. Recommendations on how to manage low counts are described in *NCCN Guidelines for Patients: Low Blood Counts*.

Supportive care resources

More information on supportive care is available at NCCN.org/patientguidelines and on the NCCN Patient Guides for Cancer app.



"I quickly learned from my oncologist that he was also a therapist. There's no concern that is too trivial or stupid for them to answer. Their job is so much easier if they know how and what you're feeling."

Immunotherapy side effects

Immune checkpoint inhibitors may cause your immune cells to attack your healthy cells.

NCCN Guidelines for Patients: Immunotherapy Side Effects: Immune Checkpoint Inhibitors explains treatment for:

- Skin and mouth symptoms
- Bowel and liver symptoms
- Thyroid, pituitary, and pancreas symptoms
- Lung symptoms

Survivorship care

Survivorship care often begins after initial cancer treatment ends. Its focus is on the wide and lasting impact of cancer and its treatment. Survivorship care will help you recover from cancer and prevent disease.

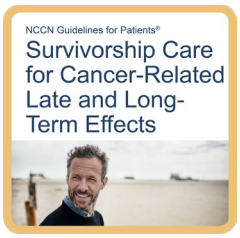
Late and long-term effects

Many side effects of treatment quickly resolve after treatment ends. But during survivorship care, your team will continue to assess for side effects.

Long-term effects start during treatment and persist after treatment is done. Less often, late effects from the cancer or treatment start long after treatment has ended.

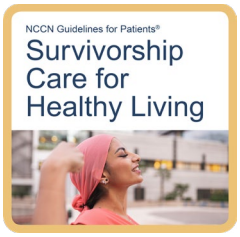
NCCN Guidelines for Patients: Survivorship Care for Cancer-Related Late and Long-Term Effects discuss management of many effects, including:

- Heart disease
- Chemobrain
- Sleep-wake disorders
- Pain



Healthy living

It's important for everyone to have a healthy lifestyle—but it's even more important for people who've had cancer. Healthy living may improve your health and 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*.



End-of-life concerns

The NCCN Guidelines for Patients: Palliative Care helps people navigate the cancer experience across the spectrum of care. It describes care for physical and emotional symptoms. It also provides guidance on talking with your team about cancer treatment and advance care planning.

Advance care planning

When cancer keeps growing despite all treatment efforts, it may be time to set some new goals. Your new goals may involve making the most of your time and ensuring that you can meet the end of life on your own terms.

Advance care planning is all about making sure that your wishes are understood and respected. The focus is on you receiving the best possible care at the end of your life. You can set up an advance care plan early on to feel less stressed and better able to cope.

Hospice care

Hospice is a type of care designed to provide comfort to people who are close to the end of life as well as the people who love them. A major goal is to keep you pain free and make sure you can leave this world comfortably and with dignity.

Key points

- Supportive care is health care that improves quality of life by addressing the challenges related to cancer.
- Quitting smoking may improve treatment results.
- There are ways to relieve some symptoms caused by mesothelioma or cancer treatment.
- Advance care planning is done to ensure that your end-of-life wishes are understood and respected.

Questions to ask

- What are the best methods to help me quit smoking?
- How will you prevent symptoms or relieve the symptoms I have?
- What happens during end-of-life care and how can I prepare for it?
- Should I tell my health care providers I'm getting supportive care? They may incorrectly think I'm getting hospice care.
- Who should I contact if my symptoms get worse?

What's next?

It's common to have many concerns about cancer. Your care team will help you. More sources of support are listed in *Chapter 5: Other resources*.

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Other resources

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32 What else to do

32 Where to get help

32 Questions to ask

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

What else to know

This guide helps you know your options so you can make informed decisions and improve your cancer care. But it's not the only resource that you have.

Ask for as much information and help as you need. Many people are interested in learning more about:

- The details of their treatment and its side effects
- Being a part of a care team
- Getting financial help
- Finding a cancer care professional who's an expert in their field
- Coping with other health problems

What else to do

Your health care center can help you with next steps. It often has on-site resources to help meet your needs and find answers to your questions. Health care centers can 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.

Where to get help

Look through the list below and visit the provided websites to learn more about these organizations.

Cancer*Care*
cancercare.org

GRACE
cancergrace.org

Imerman Angels
imermanangels.org

Triage Cancer
triagecancer.org

Questions to ask

- How do I find a health care provider who's an expert in mesothelioma?
- What's my role in making decisions on the best cancer care for me?
- What are the steps to get a second opinion?
- Should my family members be tested for mesothelioma?
- How can I connect with others and build a support system?



Words to know

advance care planning
The process of deciding what you would want if you become too sick to make medical decisions for yourself.

asbestos
A group of naturally occurring minerals found in rocks and soil used in many industrial and commercial products. It is the main cause of mesothelioma.

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

cancer staging
The process of rating the extent of cancer in the body.

chemotherapy
Cancer drugs that stop the cell life cycle so cells don't increase in number.

clinical trial
A type of research that assesses investigational tests or treatments in people.

computed tomography (CT)
A test that uses x-rays from many angles to make a picture of the inside of the body.

diagnosis
Identification of an illness based on tests.

diagnostic imaging specialist
A doctor who interprets medical images to identify and monitor diseases.

fine-needle aspiration
Removal of a tiny sample of body tissue with a very thin needle.

first-line therapy
The first type of treatment given for a health condition or disease.

immune checkpoint inhibitors
A drug treatment that enables immune T cells to kill cancer cells.

immunohistochemistry
A lab test of cancer cells to find specific cell traits involved in abnormal cell growth.

infusion
A method of giving drugs slowly through a needle into a vein.

intensity-modulated radiation therapy (IMRT)
A type of external radiation therapy that uses many beams of different intensities.

lymph node
A small, bean-shaped, disease-fighting structure in the immune system.

magnetic resonance imaging (MRI)
An imaging process that uses a magnetic field and radio waves to make pictures of the inside of the body.

medical oncologist
A doctor who is an expert in cancer drugs.

multidisciplinary team
A group of health care providers who work together to give expert care.

observation
A period of watching for cancer growth or occurrence while not receiving treatment. Also called watch and wait.

pathologist
A doctor who specializes in testing cells and tissue to find disease.

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

pleura
Two thin layers of tissue that surround and protect the lungs and the inside of the chest.

pleural effusion
An unusual buildup of extra fluid in the pleural cavity.

pleural mesothelioma
A rare cancer that develops in the thin layers of tissue that surround the lungs. Often simply called mesothelioma.

pleural thickening
Widespread scarring of the tissue surrounding the lungs.

positron emission tomography/computed tomography (PET/CT)
A test that uses two picture-making methods to show the shape and function of tissue.

radiation oncologist
A doctor who's an expert in treating cancer with radiation.

radiation therapy
A treatment that uses high-energy rays (radiation) to kill cancer cells.

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

second-line therapy
The second type of treatment given if the cancer grows.

second opinion
An evaluation of a patient's diagnosis or treatment given by a doctor who isn't the patient's current doctor.

side effect
An unhealthy or unpleasant physical or emotional response to treatment.

supportive care
Interventions to improve quality of life. Also sometimes called palliative care.

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

thoracic surgeon
A doctor who's an expert in operating on organs inside of the chest.



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

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This patient guide is based on the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Mesothelioma: Pleural, Version 2.2026. It was adapted, reviewed, and published with help from the following people:

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UC Davis Comprehensive Cancer Center
Sacramento, California

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La Jolla, California

UCLA Jonsson Comprehensive Cancer Center
Los Angeles, California

UCSF Helen Diller Family Comprehensive Cancer Center
San Francisco, California

University of Colorado Cancer Center
Aurora, Colorado

University of Michigan Rogel Cancer Center
Ann Arbor, Michigan

University of Wisconsin Carbone Cancer Center
Madison, Wisconsin

UT Southwestern Simmons
Comprehensive Cancer Center
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