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## Pleural Disorders

*Also known as Emphyema, Hemothorax, Pleurisy, Pleural Effusion, Pneumothorax*

Pleural disorders are conditions that affect the tissue that covers the outside of the lungs and lines the inside of your chest cavity. The tissue is called the pleura, and the thin space between its two layers is called the pleural space. A small amount of fluid fills the pleural space, and when you breathe in and out, this fluid helps the pleural layers glide smoothly against each other.

There are three types of pleural disorders—pleurisy, pleural effusion, and pneumothorax—and they have varying causes. Pleurisy is inflammation of the pleura. Pleural effusion and pneumothorax occur when an infection, medical condition, or chest injury causes fluid, pus, blood, air, or other gases to build up in the pleural space.

Chest pain, shortness of breath, and coughing are common symptoms of all types of pleural disorders, but treatment for pleural disorders varies depending on what type you have and how serious it is.

Explore this Health Topic to learn more about pleural disorders, our role in research and clinical trials to improve health, and where to find more information.



### Types

The types of pleural disorders are pleural effusion, pleurisy, and pneumothorax.

## Pleural effusion

Pleural effusion is a buildup of fluid in the pleural space. The cause of the buildup determines the type of pleural effusion.

- **Exudative effusion** is caused by a buildup of fluid from **inflammation**, tumors, infection, or lung injury. The types of exudative effusion vary by the fluid buildup in the pleural space. For example, an **empyema** is a buildup of infection or pus, a **hemothorax** happens when blood builds up, and a **chylothorax** results from a buildup of chyle, a substance formed in the small intestine.
- **Transudative pleural effusion** is caused by pressure in the blood vessels, most often because of a medical condition such as heart, kidney, or liver failure. The pressure pushes excess fluid into the pleural cavity.

***Fluid in the pleural space.** This image shows pleural effusion. Fluid is shown in the pleural space on the left lung. Medical Illustration Copyright © 2019 Nucleus Medical Media, All rights reserved.*

## Pleurisy

Pleurisy is inflammation of the pleura. It is also called pleuritis.

## Pneumothorax

Pneumothorax occurs when air or other gas builds up in the pleural space and may cause part or all of the lung to collapse.

There are different types of pneumothorax.

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- **Spontaneous pneumothorax** may be caused by another medical condition that affects the lungs, such as **chronic obstructive pulmonary disease (COPD)**, but people who have no signs of lung disease can also have a spontaneous pneumothorax.
- **Tension pneumothorax** is a very large pneumothorax that may result in failure of the heart and the lungs. This can interfere with blood flow through your chest and cause your blood pressure to drop.
- **Traumatic pneumothorax** is caused by a chest injury.

***Cross-section  
of normal  
lungs and  
lungs with  
pleurisy and  
pneumothorax.***

*Figure A shows the location of the lungs, airways, pleura, and diaphragm. The inset image on the left shows a closer view of the two layers of the pleura and the pleural space. Figure B shows lungs with pleurisy and a pneumothorax. The inset image on the right shows a closer view of an infected lung with thickened and inflamed pleural layers.*

## Causes

Pleural disorders may be caused by inflammation, injury, or an imbalance of fluids in the pleural space.

## Inflammation

Pleurisy is caused by inflammation in the pleura. The inflammation may happen because of an infection, tumor, or another medical condition.

The inflammation affects the two thin layers of the pleura. This can cause the surface of the layers to become rough and the fluid in between the layers to become sticky. When this happens, the two layers may rub together every time you breathe in instead of gliding past each other.

## Injury

A chest injury, even an injury that does not break the skin but causes internal damage, can allow air, fluid, or blood to leak into the pleural space. This can cause a pneumothorax or pleural effusion.

Air or blood can also leak into the pleural space as a result of a medical procedure, such as a chest [biopsy](#) , [mechanical ventilation](#), or [thoracentesis](#).

## Imbalance of fluid

Pleural effusions develop when fluid enters the pleural space faster or at a higher amount than the body can reabsorb. This imbalance of fluids can be caused by heart, kidney, or liver failure, or other medical conditions.

## Look for

- [Treatment](#) will discuss medicines or procedures that your doctor may recommend if you are diagnosed with a pleural disorder.

## Risk Factors

You may have an increased risk for a pleural disorder because of your age, your family history and genetics, your lifestyle habits, medicines you take, other medical conditions, and your sex.

### Age

Pleural disorders can happen at any age, but pneumothorax is most common in people 15 to 34 years old and people over age 55.

### Family history and genetics

Having a family history of spontaneous pneumothorax increases your risk.

## Lifestyle habits

Smoking tobacco or marijuana increases your risk of spontaneous pneumothorax.

## Medicines

Taking certain medicines can increase your risk of some pleural disorders.

- **Anticoagulants**, or blood thinners, such as heparin or warfarin, may increase the risk of hemothorax.
- **Cancer medicines**, such as dasatinib and interleukin-2, may increase the risk of pleural effusion.
- **Medicines that can cause drug-induced lupus** may increase the risk for pleural effusion. These medicines include hydralazine, used to treat high blood pressure, and procainamide, used to treat arrhythmia.
- **Nitrofurantoin**, an antibiotic used to treat urinary tract infections, may increase the risk of pleural effusion.

## Other medical conditions

Pleural disorders are often complications of other diseases, either in the lungs or elsewhere in the body.

- **Cancer**, such as lung cancer and lymphoma, or benign tumors, can cause pleural effusion.
- **Chest and heart surgery**, especially [coronary artery bypass grafting](#), can cause pleural effusion.
- **Heart failure** can cause pleural effusion due to increased pressure in the blood vessels.
- **Infections**, including viral infections such as influenza, bacterial infections such as [pneumonia](#), and infections from fungi or parasites, can cause pleural effusion.
- **Inflammatory and autoimmune diseases**, including lupus, rheumatoid arthritis, and [familial Mediterranean fever](#), can cause pleurisy.
- **Inherited disorders**, such as [Marfan syndrome](#) and [alpha-1-antitrypsin deficiency](#), can cause pneumothorax.
- **Kidney disease or liver disease** may be associated with pleural effusion.
- **Lung diseases** such as [asbestos-related lung diseases](#), COPD, [tuberculosis](#), and [LAM](#), may cause pleural effusion or pneumothorax.
- **Pancreatitis** may cause pleurisy.
- **Pulmonary embolism**, a type of [venous thromboembolism](#), may cause pleurisy.
- **Sarcoidosis** may cause pleural effusion.
- **Sickle cell disease** may cause pleurisy.

## Sex

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Men, especially those who are taller than average, are more likely than women to have a spontaneous pneumothorax, often without underlying lung disease.

## Screening and Prevention

There are no methods to screen for pleural disorders. If you have [risk factors](#) for pleural disorders, your doctor may recommend preventive strategies.

### Prevention strategies

Learn about the preventive strategies your doctor may recommend.

- **Treating conditions** that increase the risk of pleural disorders
- **Quitting smoking.** Visit [Smoking and Your Heart](#) and the National Heart, Lung, and Blood Institute's [Your Guide to a Healthy Heart](#). For free help quitting smoking, you may call the National Cancer Institute's Smoking Quitline at 1-877-44U-QUIT (1-877-448-7848).
- **Quitting or avoiding illegal drugs**, such as marijuana

### Look for

- [Diagnosis](#) will explain tests and procedures that your doctor may use to diagnose pleural disorders.
- [Life After](#) will discuss what your doctor may recommend to prevent your pleural disorder from recurring, getting worse, or causing complications.
- [Research for Your Health](#) will explain how we are using current research and advancing research to prevent pleural disorders.
- [Participate in NHLBI Clinical Trials](#) will discuss our open and enrolling clinical studies that are investigating prevention strategies for pleural disorders.

## Signs, Symptoms, and Complications

Pleural disorders may occur with no [symptoms](#) , or they may have obvious symptoms. [Signs](#) , symptoms, and complications vary depending on the pleural disorder and how severe it is.

### Signs and symptoms

The signs and symptoms for pleural disorders may include:

- **Chest pain** that is sharp or stabbing and gets worse when you breathe in deeply or cough or sneeze

- **Cough**
- **Shortness of breath**
- **Low weight or slow rate of weight gain in children.** Usually the weight is well below the child's ideal weight or the average weight of other children of the same age
- **Fever**
- **Fatigue**
- **Bluish skin** caused by not getting enough oxygen
- **Anxiety**
- **Rapid heart rate**

## Complications

Complications for pleural disorders can be life threatening. Some of the possible complications include:

- **Atelectasis**, which can be a complication of pneumothorax.
- **Empyema**, which is pus in the pleural space.
- **Sepsis**
- **Shock**, which is a life-threatening complication of hemothorax or tension pneumothorax. This can happen when blood pressure drops dangerously low.
- **Unexpandable (trapped or entrapped) lung**, which can be a complication of pleural effusion that is caused by cancer, hemothorax, or pleurisy.

## Look for

- **Diagnosis** will discuss tests and procedures used to detect signs of pleural disorders and help rule out other conditions that may mimic a disorder.
- **Treatment** will explain treatment-related complications or side effects.

## Diagnosis

Your doctor may diagnose a pleural disorder based on your medical history, a physical exam, and diagnostic tests and procedures. Before diagnosing you with a pleural disorder, your doctor will rule out other medical reasons or conditions that may be causing your signs and symptoms.

## Medical history

Your doctor will want to learn about your [signs and symptoms](#), [risk factors](#), personal health history, and family health history to determine whether you have a pleural disorder and, if so, what kind.

To help diagnose a pleural disorder, your doctor may ask you to describe any chest pain, including details such as the following:

What it feels like

- Where it is located and whether you can feel it in your arms, jaw, or shoulders
- When it started and whether it goes away and then comes back
- What makes it better or worse

This information about the chest pain you have experienced can help your doctor determine whether it is caused by problems with your heart, chest muscles, lungs, or digestive system.

## Physical exam

As part of a physical examination, your doctor will measure your [blood pressure](#) and heart rate, feel your chest and belly, take your temperature, listen to your heart and lungs, and feel your pulse. Your doctor may also check the level of oxygen in your blood with a probe on your finger or forehead.

Your doctor will listen to your breathing to find out whether your lungs are making any abnormal sounds.

- **If you have pleurisy**, the inflamed layers of the pleura may make a rough, scratchy sound as they rub against each other when you breathe. Doctors call this a pleural friction rub.
- **If you have a pleural effusion**, fluid buildup in the pleural space may prevent a friction rub. But if you have a lot of fluid, your doctor may hear a dull sound when he or she taps on your chest.
- **If you have a pneumothorax**, your doctor may hear more echo than usual when he or she taps on your chest.

## Diagnostic tests and procedures

Your doctor may order a combination of the following tests to help diagnose a pleural disorder.

- **Biopsy** to retrieve a sample of the pleura. The sample is checked for signs of disease.
- **Blood tests** to show whether you have an illness that increases your risk of pleurisy or another pleural disorder
- **Chest CT scan** to find pockets of fluid or air and signs of pneumonia, a lung abscess, tumors, blood clots, or other possible causes of pleural disorders
- **Chest MRI** to look for possible causes of pleural disorders or confirm results of other imaging tests, such as a chest CT scan
- **Chest X-ray** to look for air or fluid in the pleural space, problems with the lung or pleura, or an underlying cause of a pleural disorder, such as pneumonia, a fractured rib, or a lung tumor
- **Endoscopy** to look for signs of disease, guide the doctor while performing a biopsy, or remove pleural fluid
- **Thoracentesis** to remove a sample of pleural fluid for testing. The fluid removed during thoracentesis is tested and examined under a microscope for signs of infection, cancer, or other conditions that can cause fluid or blood to build up in the

pleural space.

- **Ultrasound** to look for fluid, air, or other abnormal findings in your chest

## Tests for other medical conditions

Your doctor may order the following tests to help rule out other medical conditions that can cause chest pain.

- **Blood tests** to rule out other medical conditions affecting the heart, liver, kidneys, or other chronic inflammatory diseases that can cause pleural disorders
- **Chest X-ray** to look for signs of [pneumonia](#) or other serious problems
- **CT angiography** to take pictures of your blood vessels and look for blood clots in the lungs. This can help rule out pulmonary embolism, a type of venous thromboembolism.
- **Electrocardiogram** to measure your heartbeat and rule out a heart problem such as [heart attack](#) or pericarditis, a type of [heart inflammation](#)
- **Echocardiography** to look for an [aortic aneurysm](#) or signs of damage to your heart

## Reminders

- Return to [Risk Factors](#) to review family history, lifestyle, or other medical conditions that increase your risk of developing pleural disorders.
- Return to [Signs, Symptoms, and Complications](#) to review common signs and symptoms of pleural disorders.

## Treatment

How your pleural disorder is treated depends on what type of pleural disorder you have and how severe it is. Some pleural disorders go away without treatment. Others will require a procedure to remove air, fluid, or other material from the pleural space. The goal of treatment is to relieve symptoms and treat the underlying condition.

## Medicines

Your doctor may recommend medicine to treat symptoms or causes of your pleural disorder, including:

- **Antibiotics, antifungals, or antiparasitic medicines** to treat an infection in the pleural space or in the lung
- **Corticosteroids** to reduce inflammation. Corticosteroids can have serious side effects with long-term use.
- **Morphine** in low doses to treat chronic shortness of breath. This medicine has a risk of addiction.
- **Nonsteroidal anti-inflammatory drugs** such as ibuprofen to reduce pain and inflammation

## Procedures and other treatments

Your doctor may perform one or more procedures to treat a pleural disorder. Many of these procedures are performed using ultrasound.

- **Chest tube** to drain fluid, blood, or air from the pleural space. This process can take several days. You may stay in the hospital while the tube is in place.
- **Heimlich valve** to prevent fluid and air from getting into your chest when you breathe in. Your doctor may attach this one-way valve to a chest tube or indwelling pleural catheter (IPC), which allows you to move around more and may allow you to go home to wait for your lung to re-expand.
- **IPC**, or indwelling pleural catheter, to drain pleural fluid. An IPC is a semi-permanent thin tube that is left in place so patients or caregivers can drain the fluid, usually a few times a week.
- **Injection of medicines** into the pleural space to break up material that cannot be removed with a needle or drained through a chest tube
- **One-way endobronchial valve** implanted in one of your [bronchial tubes](#) to allow air to exit the pleural space but not reenter
- **Oxygen therapy** for pneumothorax
- **Pleurodesis** to close up the pleural space by helping the two sides of the pleura stick together. For this procedure, your doctor will drain all of the fluid out of your chest through a chest tube. Then he or she will push a substance through the chest tube into the pleural space. The substance will irritate the surface of the pleura and cause the two layers of the pleura to stick together, preventing more fluid from building up.
- **Surgery** to remove fluid, pus, or blood clots that cannot be removed with a chest tube; to remove part of the pleura; to remove one or more ribs; or to close up the pleural space with a pleurodesis procedure
- **Thoracentesis** to remove air, blood, or other fluid from the pleural space with a needle. Possible complications include pneumothorax, pain, hemothorax and other bleeding, infection, and pulmonary edema. Complications are less likely if ultrasound is used to guide the procedure.

## Look for

- [Research for Your Health](#) will discuss how we are using current research and advancing research to treat people with pleural disorders.
- [Life After](#) will discuss what your doctor may recommend, including lifelong lifestyle changes and medical care, to prevent your condition from recurring, getting worse, or causing complications.

## Life After

As you recover from your treatment for a pleural disorder, it is important to follow your treatment plan. You may need to follow up with your doctor regularly to monitor your condition. You will also want to take steps to prevent complications or a repeat pleural