



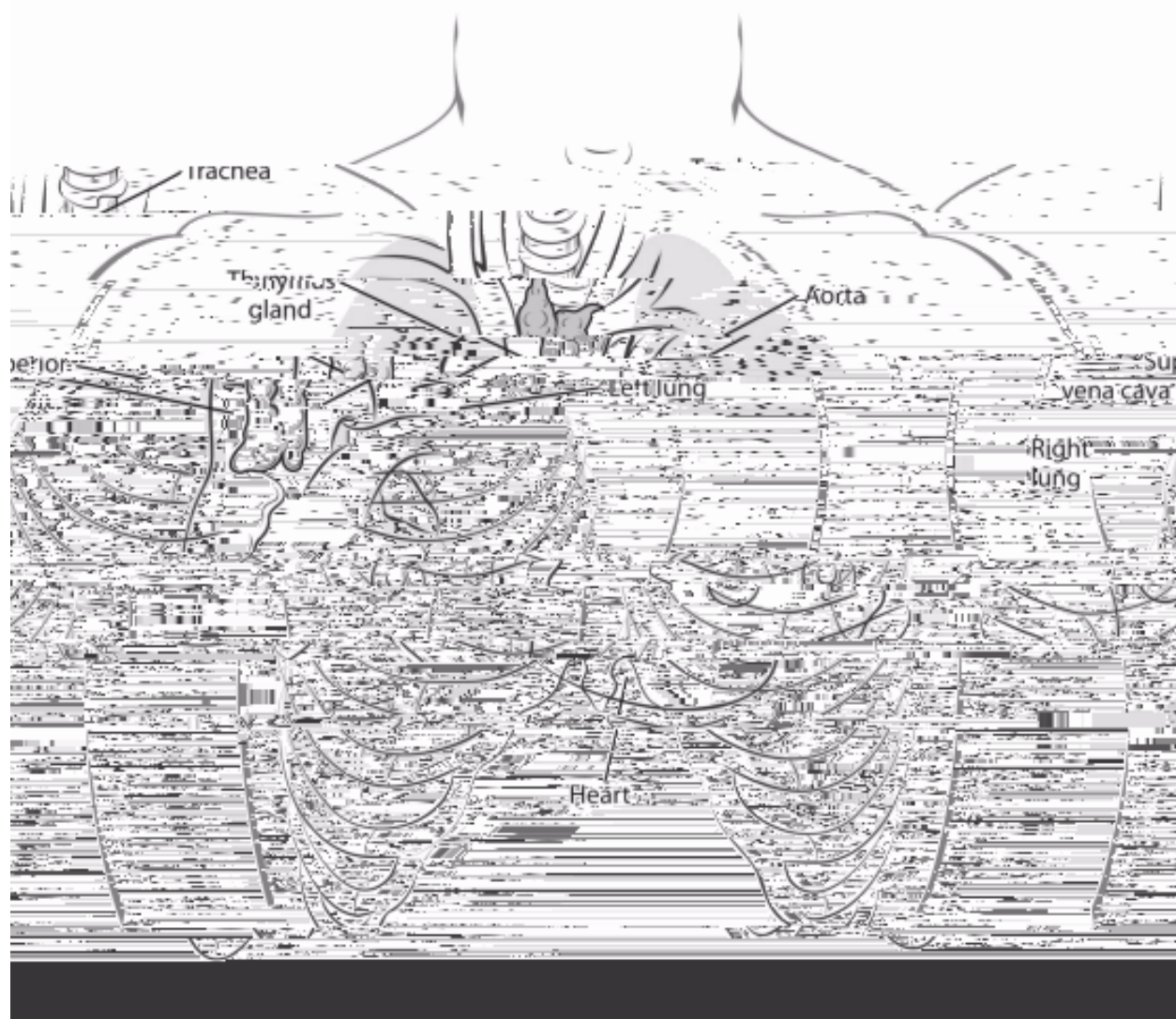
---

## What Is Thymus Cancer?

- [Thymomas and thymic carcinomas](#)
- [Other cancers in the mediastinum](#)

## The thymus

The thymus is a small organ located just behind the breast bone (sternum) in the front part of the chest. The thymus is in a part of the chest called the *mediastinum*, the space in the chest between the lungs that also contains the heart, part of the aorta, the esophagus (the tube that connects the mouth to the stomach), part of the trachea (windpipe), and many lymph nodes. The thymus sits just in front of and above the heart.



## [What Is Cancer?](#) <sup>1</sup>

Cancer starts when cells in the body begin to grow out of control. Cells in nearly any part of the body can become cancer cells. Learn more here.

## Lymphatic System

### [Anatomy Gallery: Lymphatic System](#) <sup>2</sup>

Explore our 3D interactive tour of the lymphatic system.

The thymus is divided into 2 halves, called *lobes*. It has an irregular shape. There are a lot of small bumps called *lobules* on its surface. The thymus has 3 main layers:

- The **medulla** is the inside part of the thymus.
- The **cortex** is the layer that surrounds the medulla.
- The **capsule** is the thin covering over the outside of the thymus.

The thymus reaches its maximum weight of about 1 ounce during puberty. Then it decreases in size during adulthood as it's replaced by fat tissue.

**The thymus is an important part of the body's immune system.** During fetal development and childhood, the thymus is involved in the production and maturation of T lymphocytes (also known as *T cells*), a type of white blood cell. T lymphocytes develop in the thymus and then travel to lymph nodes (bean-sized collections of immune system cells) throughout the body. There they help the immune system protect the body from viruses, fungus, and other types of infections.

The thymus is made of different types of cells. Each kind can develop into different types of cancer:

- Epithelial cells give the thymus its structure and shape. **Thymomas and thymic carcinomas**, which are the main focus of the rest of this document, develop from these cells.
- Lymphocytes make up most of the rest of the thymus. Whether in the thymus or in other parts of the body, these immune system cells can develop into cancers called [Hodgkin disease](#)<sup>3</sup> and [non-Hodgkin lymphoma](#)<sup>4</sup>.
- Kulchitsky cells, or neuroendocrine cells, are much less common cells that normally release certain hormones. These cells can give rise to cancers called *carcinoid tumors*. This document does not discuss carcinoid tumors of the thymus. Much of the information in [Lung Carcinoid Tumor](#)<sup>5</sup> and [Gastrointestinal Carcinoid Tumors](#)<sup>6</sup> also applies to carcinoids of the thymus.

## Thymomas and thymic carcinomas

**Thymomas and thymic carcinomas are tumors that start from thymic epithelial cells.** Not all doctors agree about the best way to describe and classify these tumors. In the past, thymomas were sometimes divided into benign (non-cancer) thymomas and malignant (cancer) thymomas, based on whether they had grown beyond the thymus into other tissues or organs. Now, most doctors think all thymomas may become cancer over time, and the best way to predict how likely they are to come back after treatment is to describe whether they have grown into tissues beyond the thymus (and if so, how far). This is done by the surgeon who notes whether or not the tumor is attached to nearby organs and by the pathologist who looks at samples from the margins (edges) of the tumor under the microscope. The system used to describe the stage (extent) of thymomas is covered in [How Is Thymus Cancer Staged?](#)<sup>7</sup>

### WHO classification system for thymomas

Most doctors also classify thymomas by how they look under a microscope and by tests done on the tissue samples. This is called the *histologic type*. The system used for this classification, which was developed by the World Health Organization (WHO), assigns letters to the different types of thymomas.

**Type A:** The cells in these tumors are spindle-shaped or oval epithelial cells that are fairly normal looking. This is the rarest type of thymoma, but it seems to have the best prognosis (outlook).

**Type AB:** This type, also known as a *mixed thymoma*, looks like type A but there are also areas of lymphocytes mixed in the tumor.

**Type B1:** This type looks a lot like the normal structure of the thymus. It has a lot of lymphocytes along with normal-looking thymus cells.

**Type B2:** This type also has a lot of lymphocytes, but the thymus epithelial cells are larger with abnormal nuclei (the DNA-containing part of the cell).

**Type B3:** This type has few lymphocytes and mostly made of thymus epithelial cells that look pretty close to normal.

**Type C:** This is the most dangerous form and is also known as *thymic carcinoma*. It contains cells that look very abnormal under the microscope. The cells may no longer

even look like thymus cells. These tumors have often grown into nearby tissues and/or spread to distant tissues and organs (metastasized) at the time they are found. This type of thymoma has the worst outlook (prognosis).

Type AB and type B2 are the most common types of thymoma, and type A is the least common. As you go from A to C, the outlook for survival tends to get worse. Type A has the best outlook, and type C has the worst. Still, for most types of thymoma, the [stage](#)<sup>8</sup> (extent of growth and spread) is a better predictor of a person's outcome.

## Other cancers in the mediastinum

Other cancers and tumors can occur in the mediastinum. Cancers can start in the esophagus ([esophageal cancer](#)<sup>9</sup>), in the heart (and the tissue surrounding it), in the [trachea](#)<sup>10</sup>, and in the lymph nodes ([lymphoma](#)<sup>11</sup>).

9. [www.cancer.org/cancer/types/esophagus-cancer.html](http://www.cancer.org/cancer/types/esophagus-cancer.html)
10. [www.cancer.org/cancer/types/laryngeal-and-hypopharyngeal-cancer.html](http://www.cancer.org/cancer/types/laryngeal-and-hypopharyngeal-cancer.html)
11. [www.cancer.org/cancer/types/lymphoma.html](http://www.cancer.org/cancer/types/lymphoma.html)
12. [www.cancer.org/cancer/types/thyroid-cancer.html](http://www.cancer.org/cancer/types/thyroid-cancer.html)
13. [www.cancer.org/cancer/types/lung-cancer.html](http://www.cancer.org/cancer/types/lung-cancer.html)
14. [www.cancer.org/cancer/types/thymus-cancer/references.html](http://www.cancer.org/cancer/types/thymus-cancer/references.html)

## References

[See all references for Thymus Cancer](#)

Last Revised: October 4, 2017

---

# Key Statistics About Thymus Cancers

Although thymic tumors (thymomas and thymic carcinomas) are the most common tumors in the anterior mediastinum (the front part of the space between the lungs), overall they are rare. They occur at a rate of only 1.3 cases for every million people each year in the US. This works out to about 400 cases per year. (The exact number diagnosed each year is not known.)

Survival statistics for thymomas are discussed in [Survival rates for thymus cancer](#)<sup>1</sup>.

## Hyperlinks

1. [www.cancer.org/cancer/types/thymus-cancer/detection-diagnosis-staging/survival-rates.html](http://www.cancer.org/cancer/types/thymus-cancer/detection-diagnosis-staging/survival-rates.html)

## References

National Cancer Institute. Thymoma and Thymic Carcinoma Treatment (PDQ®)—Health Professional Version. 2022. Accessed at [https://www.cancer.gov/types/thymoma/hp/thymoma-treatment-pdq#section\\_1.3](https://www.cancer.gov/types/thymoma/hp/thymoma-treatment-pdq#section_1.3) on May 14, 2024.

Last Revised: May 15, 2024

# What's New in Thymus Cancer Research?

There's always research going on in the area of thymic tumors (thymomas and thymic carcinomas). Scientists are looking for causes of thymic tumors, and doctors are looking for better ways to find, classify, and treat them.

- [Testing thymus tumors](#)
- [Treating thymus tumors](#)

## Testing thymus tumors

Researchers are looking for more accurate ways of predicting how aggressive a tumor is so the best treatment can be chosen. This includes looking at the gene changes found in the tumor cells that make them different from normal cells.

Improving imaging tests may also help doctors better decide which tumors can be safely removed with surgery.

## Treating thymus tumors

Studies are looking for newer treatments, as well as different ways to use current treatments, to improve the options for people with thymus tumors.

## Surgery

Traditionally, [surgery](#)<sup>1</sup> has removed the thymus through a long incision in the front of the chest (a median sternotomy). This type of operation can be painful, and it often requires a long recovery time.

For smaller thymus tumors, some surgeons now operate through several smaller incisions, using long, thin surgical instruments, including one with a tiny video camera on the end. This is known as a **minimally invasive thymectomy (MIT)**. This can be done with the surgeon either holding the tools directly (**video-assisted thoracoscopic surgery**, or **VATS**), or sitting at a control panel and moving very precise robotic arms with tools on the ends (**robotic-assisted thoracoscopic surgery**, or **RATS**). These approaches generally result in less pain after surgery (because of the smaller incisions), as well as a quicker recovery time. They might have other advantages as well. Still, it's not clear if it's better to use these techniques.

Surgeons are trying to determine which patients are the best candidates for MIT, as well as improving on the procedures themselves.

## Radiation therapy

[Radiation](#)<sup>2</sup> is an important part of the treatment for some thymus tumors, especially if they can't be removed completely with surgery. Unfortunately the thymus sits in the front of the chest, near many delicate and important structures. The radiation must be aimed carefully to try to avoid damaging these structures. Newer forms of radiation therapy can help do this. Some examples include:

**Image-guided radiation therapy (IGRT):** In this approach, an imaging test is done to create pictures of the thymus just before giving each treatment. Because the position of the thymus in the body can change slightly from day to day, IGRT can help ensure the radiation is aimed more precisely.

**Motion management techniques:** These can be used to help adjust for body movements during treatment, such as breathing, which might move the area that needs to be treated.

**Proton beam therapy:** This treatment focuses protons on the cancer, instead of x-rays. In standard radiation therapy, the x-ray beams release their energy both before and after they hit their target, so they can damage any organ along their path. But protons cause little damage to tissues they pass through and then release their energy only after traveling a certain distance. This can deliver more radiation to the cancer while doing less damage to nearby normal tissues.



## **Newer types of drug treatments**

Chemotherapy can often help shrink thymus cancers, but it doesn't always work, and it often causes side effects, but it.

Accessed at [https://www.nccn.org/professionals/physician\\_gls/pdf/thymic.pdf](https://www.nccn.org/professionals/physician_gls/pdf/thymic.pdf) on May 14, 2024.

Nguyen D. Thymectomy. UpToDate. 2024. Accessed at <https://www.uptodate.com/contents/thymectomy> on May 14, 2024.

Last Revised: May 15, 2024

### Written by

The American Cancer Society medical and editorial content team  
(<https://www.cancer.org/cancer/acs-medical-content-and-news-staff.html>)

Our team is made up of doctors and oncology certified nurses with deep knowledge of cancer care as well as editors and translators with extensive experience in medical writing.

American Cancer Society medical information is copyrighted material. For reprint requests, please see our Content Usage Policy ([www.cancer.org/about-us/policies/content-usage.html](http://www.cancer.org/about-us/policies/content-usage.html)).

**cancer.org | 1.800.227.2345**