



# About Stomach Cancer

## Overview and Types

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

- [What Is Stomach Cancer?](#)

## Research and Statistics

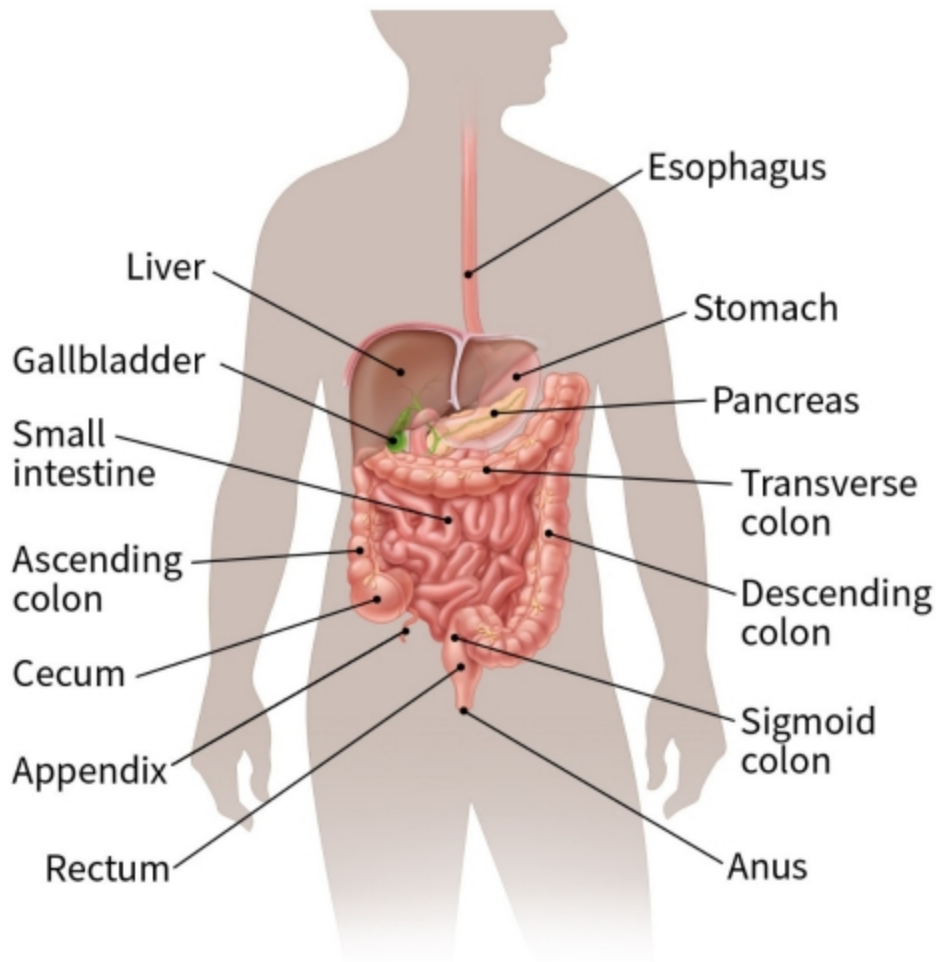
See the latest estimates for new cases of stomach cancer and deaths in the US and what research is currently being done.

- [What Are the Key Statistics About Stomach Cancer?](#)
- [What's New in Stomach Cancer Research and Treatment?](#)

## What Is Stomach Cancer?

Cancer starts when cells in the body begin to grow out of control. Cells in nearly any part of the body can become cancer, and can spread to other areas of the body. To learn more about how cancers start and spread, see [What Is Cancer?](#)

Stomach cancer, also called **gastric cancer**, starts in the stomach. To understand stomach cancer, it helps to know about the normal structure and function of the stomach.



## The stomach

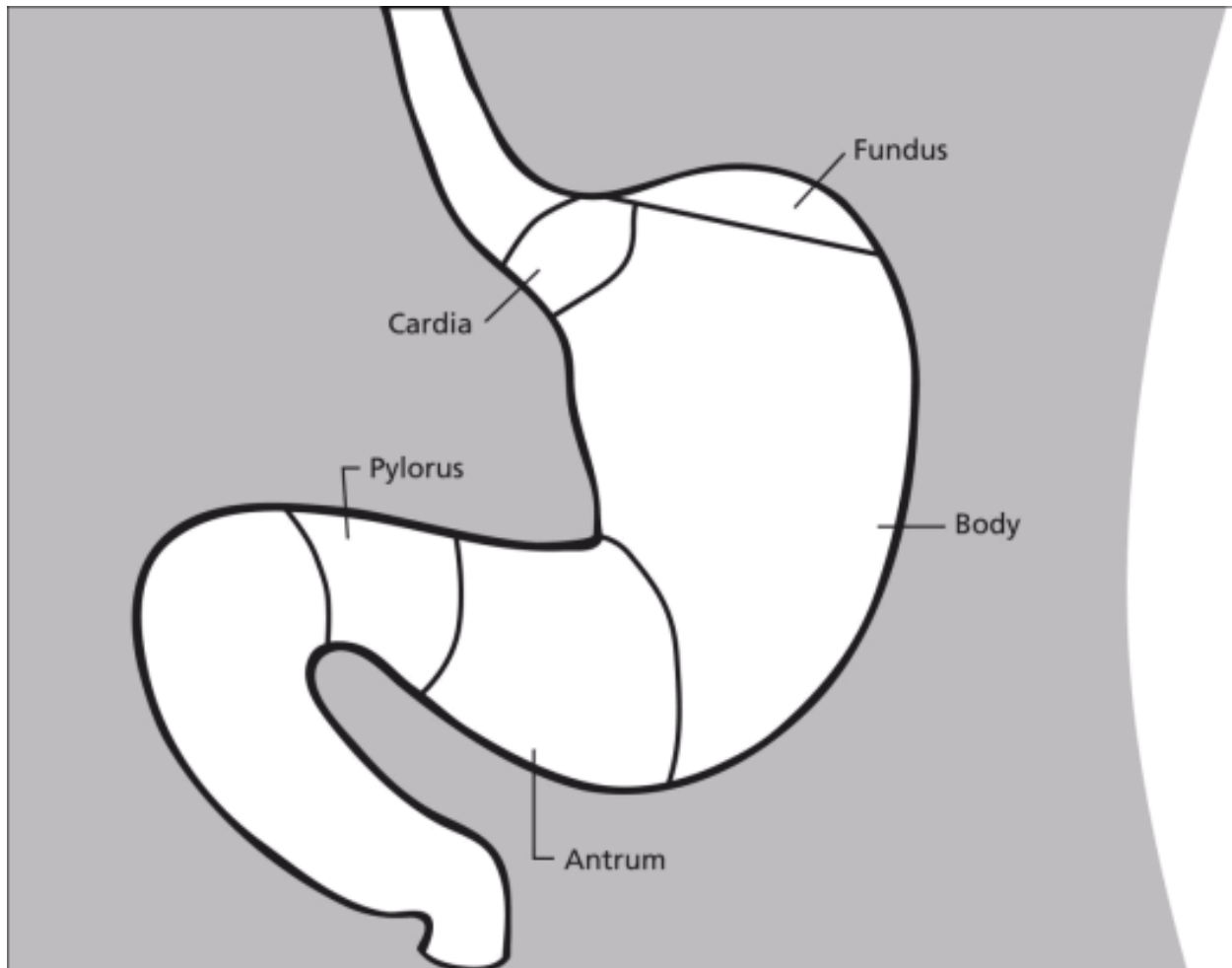
After food is chewed and swallowed, it enters the esophagus, a tube that carries food through the throat and chest to the stomach. The esophagus joins the stomach at the **gastroesophageal (GE) junction**, which is just beneath the diaphragm (the thin sheet of breathing muscle under the lungs). The stomach is a sac-like organ that holds food and starts to digest it by secreting gastric juice. The food and gastric juice are mixed and then emptied into the first part of the small intestine called the **duodenum**.

Some people use the word stomach to refer to the area of the body between the chest and the pelvic area. The medical term for this area is the abdomen. For instance, some people with pain in this area would say they have a "stomachache", when in fact the pain could be coming from the appendix, small intestine, colon (large intestine), or other organs in the area. Doctors would call this symptom abdominal pain, because the stomach is only one of many organs in the abdomen.

Stomach cancer should not be confused with other cancers that can occur in the abdomen, like cancer of the [colon \(large intestine\)](#), [liver](#), [pancreas](#), or [small intestine](#) because these cancers can have different symptoms, different outlooks, and different treatments.

## Parts of the stomach

The stomach has 5 parts:



- **Cardia:** The first part is closest to the esophagus
- **Fundus:** The upper part of the stomach next to the cardia
- **Body (corpus):** The main part of the stomach, between the upper and lower parts
- **Antrum:** The lower portion (near the intestine), where the food mixes with gastric juice
- **Pylorus:** The last part of the stomach, which acts as a valve to control emptying of

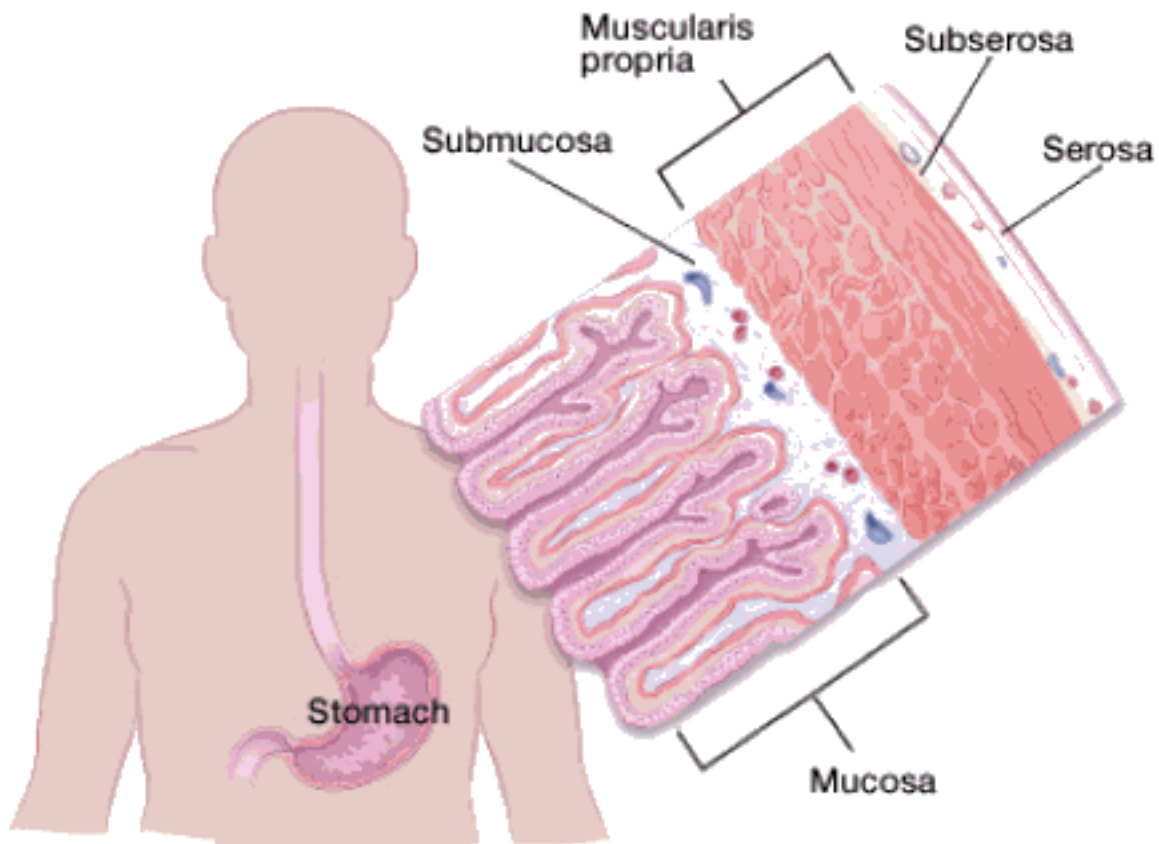
the stomach contents into the small intestine

The first 3 parts of the stomach (cardia, fundus, and body) are sometimes called the **proximal stomach**. Some cells in these parts of the stomach make acid and pepsin (a digestive enzyme), the parts of the gastric juice that help digest food. They also make a protein called **intrinsic factor**, which the body needs to absorb vitamin B12.

The lower 2 parts (antrum and pylorus) are called the **distal stomach**. The stomach has 2 curves, which form its inner and outer borders. They are called the **lesser curvature** and **greater curvature**, respectively.

Other organs next to the stomach include the colon, liver, spleen, small intestine, and pancreas.

The stomach wall has 5 layers:



- The innermost layer is the mucosa. This is where stomach acid and digestive

enzymes are made. Most stomach cancers start in this layer.

- Next is a supporting layer called the submucosa.
- Outside of this is the muscularis propria, a thick layer of muscle that moves and mixes the stomach contents.
- The outer 2 layers, the subserosa and the outermostserosa, wrap the stomach.

The layers are important in determining [the stage \(extent\) of the cancer](#) and in helping determine a person's prognosis (outlook). As a cancer grows from the mucosa into deeper layers, the stage becomes more advanced and the prognosis is not as good.

## Development of stomach cancer

Stomach cancers tend to develop slowly over many years. Before a true cancer develops, pre-cancerous changes often occur in the inner lining (mucosa) of the stomach. These early changes rarely cause symptoms and therefore often go undetected.

Cancers starting in different sections of the stomach may cause different symptoms and tend to have different outcomes. The cancer's location can also affect the treatment options. For example, cancers that start at the GE junction are staged and treated the same as cancers of the esophagus. A cancer that starts in the cardia of the stomach but then grows into the GE junction is also staged and treated like a cancer of the esophagus. (For more information, see [Esophagus Cancer](#).)

## Types of stomach cancers

### Adenocarcinoma

Most (about 90% to 95%) cancers of the stomach are adenocarcinomas. A stomach cancer or gastric cancer almost always is an adenocarcinoma. These cancers develop from the cells that form the innermost lining of the stomach (the mucosa).

### Lymphoma

These are cancers of the immune system tissue that are sometimes found in the wall of the stomach. The treatment and outlook depend on the type of lymphoma. For more detailed information, see [Non-Hodgkin Lymphoma](#).

### Gastrointestinal stromal tumor (GIST)

These rare tumors start in very early forms of cells in the wall of the stomach called **interstitial cells of Cajal**. Some of these tumors are non-cancerous (benign); others are cancerous. Although GISTs can be found anywhere in the digestive tract, most are found in the stomach. For more information, see [Gastrointestinal Stromal Tumor \(GIST\)](#).

## Carcinoid tumor

These tumors start in hormone-making cells of the stomach. Most of these tumors do not spread to other organs. These tumors are discussed in more detail in [Gastrointestinal Carcinoid Tumors](#).

## Other cancers

Other types of cancer, such as squamous cell carcinoma, small cell carcinoma, and leiomyosarcoma, can also start in the stomach, but these cancers are very rare.

- [References](#)

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# Key Statistics for Stomach Cancer

The American Cancer Society's estimates for stomach cancer in the United States for 2018 are:

- About 26,240 cases of stomach cancer will be diagnosed (16,520 in men and 9,720 in women)
- About 10,800 people will die from this type of cancer (6,510 men and 4,290 women)

Stomach cancer mostly affects older people. The average age of people when they are diagnosed is 68. About 6 of every 10 people diagnosed with stomach cancer each year

are 65 or older. The risk that a man will will develop stomach cancer in their lifetime is about 1 in 95. For women the chance is about 1 in 154. Bute each person's risk can be affected by certain [other factors](#).

In the US, the number of new cases of stomach cancer have decreased about 1.5% each year over the last 10 years. Stomach cancer is much more common in other parts of the world, particularly in less developed countries. It is one of the leading causes of cancer-related deaths in the world.

Until the late 1930s, stomach cancer was the leading cause of cancer death in the United States. Now, stomach cancer is well down on this list. The reasons for this decline are not completely known, but may be linked to increased use of refrigeration for food storage. This made fresh fruits and vegetables more available and decreased the use of salted and smoked foods. Some doctors think the decline may also be linked to the frequent use of antibiotics to treat infections. Antibiotics can kill the bacteria called *Helicobacter pylori* (*H pylori*), which is thought to be a [major cause](#) of stomach cancer.

For statistics on survival for stomach cancer, see [Survival Rates for Stomach Cancer](#).

Visit the American Cancer Society's [Cancer Statistics Center](#) for more key statistics.

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## What's New in Stomach Cancer

# Research?

Important research on stomach cancer is being done in many university hospitals, medical centers, and other institutions around the world. Scientists are learning more about what causes the disease and how best to treat it.

## Risk factors

### Diet

Research has clearly shown that differences in diet are an important factor in explaining variations in stomach cancer risk around the world. Recent research in countries with relatively low stomach cancer risk has provided some insight into risk factors. Diets high in preserved meats and low in fresh fruits and vegetables have been linked with higher risk.

### Helicobacter pylori infection

Recent studies have shown that certain types of *H pylori* (especially the *cagA* strains) are more strongly linked to stomach cancer. Some inherited traits related to blood groups may also affect whether someone infected with *H pylori* will develop cancer. Further research is needed to help doctors determine how to use this information to test which people might be at higher risk for developing stomach cancer.

Recent research has also studied the interaction of *H pylori* infection with other risk factors. For example, they have found that a healthy diet is especially important for reducing stomach cancer risk for people infected with *H pylori*.

## Chemoprevention

Chemoprevention is the use of natural or man-made chemicals to lower the risk of developing cancer. Some types of chemicals might be useful in helping prevent stomach cancer.

### Antioxidants

Many carcinogenic (cancer-causing) factors cause cells to form a type of chemical



called a **free radical**. Free radicals can damage important parts of cells such as genes. Depending on how severe the damage is, the cells may die or they may become cancerous.

Antioxidants are a group of nutrients and other chemicals that can destroy free radicals or prevent them from forming. These nutrients include vitamin C, beta-carotene, vitamin E, and the mineral selenium. Studies that have looked at using dietary supplements to lower stomach cancer risk have had mixed results so far. There is some evidence that combinations of antioxidant supplements may reduce the risk of stomach cancer in people with poor nutrition to begin with. Further research in this area is needed.

## **Antibiotics**

Studies are being done to see whether antibiotic treatment of people who are chronically infected by *H pylori* will help prevent stomach cancer. Some studies have found that treating this infection may prevent pre-cancerous stomach abnormalities, but more research is needed.

Although not truly chemoprevention, antibiotics may help prevent stomach cancer from recurring in some cases. Research has shown that antibiotics may lower the risk that the cancer will come back in another part of the stomach in people who have been treated with endoscopic mucosal resection for early-stage stomach cancer.

Unfortunately, in the United States stomach cancers are more often found at a later stage, so it's not clear how useful these results might be here.

## **Non-steroidal anti-inflammatory drugs (including aspirin)**

Some (but not all) studies have found that people who take non-steroidal anti-inflammatory drugs (NSAIDs) such as aspirin or ibuprofen might have a lower risk of stomach cancer. More research is needed to better define this possible link. In the meantime, doctors generally don't recommend taking these medicines just to try to lower your risk of cancer, as they can cause serious side effects in some people.

## **Staging**

### **Sentinel lymph node mapping**

Doctors are trying to identify the spread of stomach cancer to lymph nodes using this technique, which has proved very successful in [melanoma](#) and [breast cancer](#).

In sentinel lymph node mapping, the surgeon injects a blue dye and/or a radioactive tracer substance into the cancer. These concentrate in the lymph nodes that would be the first site of cancer spread. Doctors can remove these lymph nodes and look for cancer. If no cancer is found in these lymph nodes, then the cancer is unlikely to have reached others, and a full lymph node removal might not be needed. If cancer is found in the sentinel lymph node(s), then all the lymph nodes would still need to be removed.

This technique has been shown to help find more lymph nodes to remove, and to find lymph nodes that are more likely to contain cancer cells. But this technique is still being studied in stomach cancer and is not yet ready for widespread use.

## Treatment

### Chemotherapy drugs and combinations

Some studies are testing new ways to combine treatments already known to be active against stomach cancer or other cancers.

Several [chemotherapy](#) drugs are approved and used to treat stomach cancer, and some are used together in combination with each other. Newer chemotherapy (chemo) drugs are also being studied. For example, S-1 is an oral chemo drug related to 5-FU. This drug is commonly used for stomach cancer in some other parts of the world and continues to be studied, but it is not yet available in the United States. New ways of giving chemo are also being studied. For example, some doctors are looking at infusing chemo directly into the abdomen (intraperitoneal chemotherapy) to see if it might work better with fewer side effects.

Other studies are testing the best ways to combine chemo with [radiation therapy](#), targeted therapies, or immunotherapy. A good deal of effort is being directed at improving the results of [surgery](#) by adding chemo and/or radiation therapy either before or after surgery. Some studies are also looking at benefits of giving chemo during surgery. Several clinical trials are in progress.

### Targeted therapies

Chemo drugs target cells that divide rapidly, which is why they work against cancer cells. But there are other aspects of cancer cells that make them different from normal cells. In recent years, researchers have developed new [targeted drugs](#) to try to exploit these differences. Targeted drugs sometimes work when standard chemo drugs don't. They also tend to have less severe side effects than chemo drugs.

**Drugs that block HER2:** Some stomach cancers have too much of the HER2 protein on the surface of their cells, which helps them grow. Drugs that target this protein might help treat these cancers. Trastuzumab (Herceptin) is already approved for use against advanced stomach cancer. Other drugs that target HER2, such as lapatinib (Tykerb<sup>®</sup>), pertuzumab (Perjeta<sup>®</sup>), and trastuzumab emtansine (Kadcyla<sup>®</sup>) are now being studied in clinical trials.

**Drugs that block EGFR:** EGFR is another protein found on some stomach cancer cells that helps them grow. Panitumumab (Vectibix<sup>®</sup>) is a drug that targets EGFR that is being tested against stomach cancer. This drug is already FDA-approved to treat some other cancers.

**Other targeted drugs:** Other drugs target different parts of cancer cells. For example, another targeted drug being studied against stomach cancer is apatinib.

Most research in this area is looking at combining targeted agents with chemotherapy or with each other.

## Immunotherapy

Immunotherapy is an approach that uses drugs to try and help the body's immune system fight the cancer.

In 2017, pembrolizumab (Keytruda<sup>®</sup>) became the first immunotherapy agent approved to treat stomach cancer in some patients whose treatment did not work or stopped working. Pembrolizumab is an immune checkpoint inhibitor and targets PD-L1, a protein found on some stomach cancer cells. For more information on this type of treatment, see [Immunotherapy](#) and [Immune Checkpoint Inhibitors to Treat Cancer](#).

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