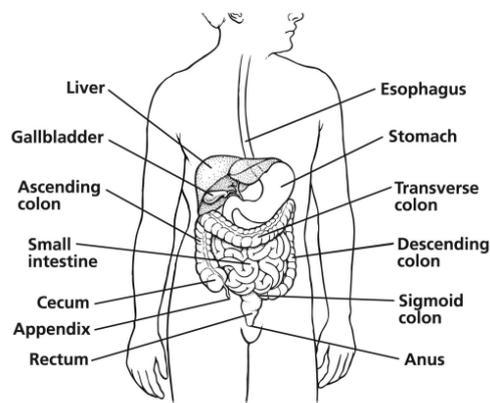


## Stomach Cancer



### What is stomach cancer?

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



### The stomach

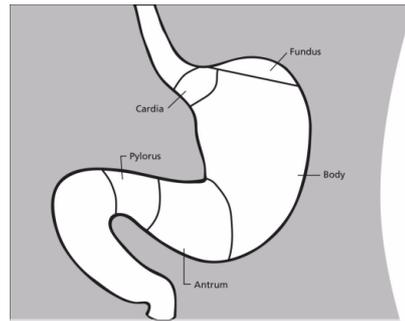
After food is chewed and swallowed, it enters the esophagus, a tube that carries food through the neck and chest to the stomach. The esophagus joins the stomach at the *gastroesophageal (GE) junction*, which is just beneath the diaphragm (the thin sheet of breathing muscle under the lungs). The stomach 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 may have different symptoms, different outlooks, and different treatments.

## Parts of the stomach:

The stomach has 5 parts:



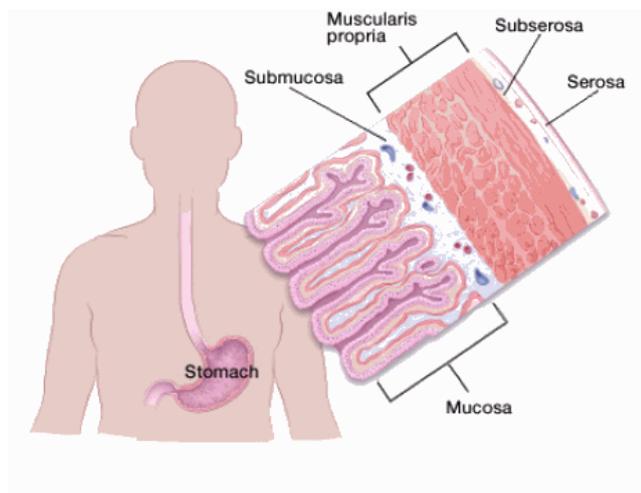
- **Cardia:** The first portion (closest to the esophagus)
- **Fundus:** The upper part of the stomach next to the cardia.
- **Body (corpus):** The main part of the stomach, between the upper and lower parts
- **Antrum:** The lower portion (near the intestine), where the food is mixed with gastric juice
- **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 outermost *serosa*, wrap the stomach.

The layers are important in determining [the stage \(extent\) of the cancer](#) and in helping to 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 our document [Esophagus Cancer](#).)

Stomach cancers can spread (metastasize) in different ways. They can grow through the wall of the stomach and invade nearby organs. They can also spread to the lymph vessels and nearby lymph nodes. Lymph nodes are bean-sized structures that help fight infections. The stomach has a very rich network of lymph vessels and nodes. As the stomach cancer becomes more advanced, it can travel through the bloodstream and spread to organs such as the liver, lungs, and bones. If cancer has spread to the lymph nodes or to other organs, the patient's outlook is not as good.

### **Types of stomach cancers**

Different types of stomach cancer include:

#### **Adenocarcinoma**

About 90% to 95% of cancers of the stomach are adenocarcinomas. When the term *stomach cancer* or *gastric cancer* is used, it almost always refers to an adenocarcinoma. These cancers develop from the cells that form the innermost lining of the stomach (known as the *mucosa*).

#### **Lymphoma**

These are cancers of the immune system tissue that are sometimes found in the wall of the stomach. About 4% of stomach cancers are lymphomas. The treatment and outlook depend on the type of lymphoma. For more detailed information, see our document [Non-Hodgkin Lymphoma](#).

#### **Gastrointestinal stromal tumor (GIST)**

These are rare tumors that 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 our document [Gastrointestinal Stromal Tumor \(GIST\)](#).

## **Carcinoid tumor**

These are tumors that start in hormone-making cells of the stomach. Most of these tumors do not spread to other organs. About 3% of stomach cancers are carcinoid tumors. These tumors are discussed in more detail in our document [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.

**The information in the remainder of this document refers only to adenocarcinoma of the stomach.**

## **CAUSES, RISK FACTORS, AND PREVENTION**

### **What are the risk factors for stomach cancer?**

A risk factor is anything that affects your chance of getting a disease such as cancer. Different cancers have different risk factors. Some risk factors, like smoking, can be changed. Others, like a person's age or family history, can't be changed.

But risk factors don't tell us everything. Having a risk factor, or even several risk factors, does not mean that you will get the disease. And many people who get the disease may have few or no known risk factors.

Scientists have found several risk factors that make a person more likely to get stomach cancer. Some of these can be controlled, but others cannot.

### **Gender**

Stomach cancer is more common in men than in women.

### **Age**

There is a sharp increase in stomach cancer rates in people over the age of 50. Most people diagnosed with stomach cancer are between their late 60s and 80s.

### **Ethnicity**

In the United States, stomach cancer is more common in Hispanic Americans, African Americans, and Asian/Pacific Islanders than it is in non-Hispanic whites.

### **Geography**

Worldwide, stomach cancer is more common in Japan, China, Southern and Eastern Europe, and South and Central America. This disease is less common in Northern and Western Africa, South Central Asia, and North America.

### **Helicobacter pylori infection**

Infection with *Helicobacter pylori* (*H pylori*) bacteria seems to be a major cause of stomach cancer, especially cancers in the lower (distal) part of the stomach. Long-term infection of the stomach with this germ may lead to inflammation (called *chronic atrophic gastritis*) and pre-cancerous changes of the inner lining of the stomach. (See "[Do we know what causes stomach cancer?](#)")

People with stomach cancer have a higher rate of *H pylori* infection than people without this cancer. *H pylori* infection is also linked to some types of lymphoma of the stomach. Even so, most people who carry this germ in their stomach never develop cancer.

### **Stomach lymphoma**

People who have had a certain type of lymphoma of the stomach known as *mucosa-associated lymphoid tissue (MALT) lymphoma* have an increased risk of getting adenocarcinoma of the stomach. This is probably because MALT lymphoma of the stomach is caused by infection with *H pylori* bacteria.

### **Diet**

An increased risk of stomach cancer is seen in people with diets that have large amounts of smoked foods, salted fish and meat, and pickled vegetables. Nitrates and nitrites are substances commonly found in cured meats. They can be converted by certain bacteria, such as *H pylori*, into compounds that have been shown to cause stomach cancer in lab animals.

On the other hand, eating lots of fresh fruits and vegetables appears to lower the risk of stomach cancer. (See "[Can stomach cancer be prevented?](#)")

### **Tobacco use**

[Smoking](#) increases stomach cancer risk, particularly for cancers of the upper portion of the stomach near the esophagus. The rate of stomach cancer is about doubled in smokers.

### **Being overweight or obese**

Being overweight or obese is a possible cause of cancers of the cardia (the upper part of the stomach nearest the esophagus), but the strength of this link is not yet clear.

### **Previous stomach surgery**

Stomach cancers are more likely to develop in people who have had part of their stomach removed to treat non-cancerous diseases such as ulcers. This might be because the stomach makes less acid, which allows more nitrite-producing bacteria to be present. Reflux (backup) of bile from the small intestine into the stomach after surgery might also add to the increased risk. These cancers typically develop many years after the surgery.

### **Pernicious anemia**

Certain cells in the stomach lining normally make a substance called *intrinsic factor (IF)* that we need to absorb vitamin B12 from foods. People without enough IF may end up with a vitamin B12 deficiency, which affects the body's ability to make new red blood cells and can cause other problems as well. This condition is called *pernicious anemia*. Along with anemia (too few red blood cells), people with this disease have an increased risk of stomach cancer.

### **Menetrier disease (hypertrophic gastropathy)**

In this condition, excess growth of the stomach lining causes large folds in the lining and leads to low levels of stomach acid. Because this disease is very rare, it is not known exactly how much this increases the risk of stomach cancer.

## **Type A blood**

Blood type groups refer to certain substances that are normally present on the surface of red blood cells and some other types of cells. These groups are important in matching blood for transfusions. For unknown reasons, people with type A blood have a higher risk of getting stomach cancer.

## **Inherited cancer syndromes**

Some inherited conditions may raise a person's risk of stomach cancer.

### **Hereditary diffuse gastric cancer**

This inherited syndrome greatly increases the risk of developing stomach cancer. This condition is rare, but the lifetime stomach cancer risk among affected people is about 70% to 80%. Women with this syndrome also have an increased risk of getting a certain type of [breast cancer](#). This condition is caused by mutations (defects) in the *CDH1* gene.

### **Hereditary non-polyposis colorectal cancer (HNPCC)**

HNPCC, also known as *Lynch syndrome*, is an inherited genetic disorder that increases the risk of colorectal cancer. People with this syndrome also have an increased risk of getting stomach cancer (as well as some other cancers). In most cases, this disorder is caused by a defect in either the *MLH1* or *MSH2* gene, but other genes can cause HNPCC, including *MLH3*, *MSH6*, *TGFBR2*, *PMS1*, and *PMS2*.

### **Familial adenomatous polyposis (FAP)**

In FAP syndrome, people get many polyps in the colon, and sometimes in the stomach and intestines as well. People with this syndrome are at greatly increased risk of getting [colorectal cancer](#) and have a slightly increased risk of getting stomach cancer. It is caused by mutations in the *APC* gene.

### **BRCA1 and BRCA2**

People who carry mutations of the inherited breast cancer genes *BRCA1* or *BRCA2* may also have a higher rate of stomach cancer.

### **Li-Fraumeni syndrome**

People with this syndrome have an increased risk of several types of cancer, including developing stomach cancer at a relatively young age. Li-Fraumeni syndrome is caused by a mutation in the *TP53* gene.

### **Peutz-Jeghers syndrome (PJS)**

People with this condition develop polyps in the stomach and intestines, as well as in other areas including the nose, the airways of the lungs, and the bladder. The polyps in the stomach and intestines are a special type called *hamartomas*. They can cause problems like bleeding or blockage of the intestines. PJS can also cause dark freckle-like spots on the lips, inner cheeks and other areas. People with PJS have an increased risk of cancers of the breast, colon, [pancreas](#), stomach, and several other organs. This syndrome is caused by mutations in the gene *STK11*.

## **A family history of stomach cancer**

People with first-degree relatives (parents, siblings, or children) who have had stomach cancer are more likely to develop this disease.

## **Some types of stomach polyps**

Polyps are non-cancerous growths on the lining of the stomach. Most types of polyps (such as hyperplastic polyps or inflammatory polyps) do not seem to increase a person's risk of stomach cancer, but adenomatous polyps – also called *adenomas* – can sometimes develop into cancer.

## **Epstein-Barr virus (EBV) infection**

Epstein-Barr virus causes infectious mononucleosis (also called *mono*). Almost all adults have been infected with this virus at some time in their lives, usually as children or teens.

EBV has been linked to some forms of [lymphoma](#). It is also found in the cancer cells of about 5% to 10% of people with stomach cancer. These people tend to have a slower growing, less aggressive cancer with a lower tendency to spread. EBV has been found in some stomach cancer cells, but it isn't yet clear if this virus actually causes stomach cancer.

## **Certain occupations**

Workers in the coal, metal, and rubber industries seem to have a higher risk of getting stomach cancer.

## **Common variable immune deficiency (CVID)**

People with CVID have an increased risk of stomach cancer. The immune system of someone with CVID can't make enough antibodies in response to germs. People with CVID have frequent infections as well as other problems, including atrophic gastritis and pernicious anemia. They are also more likely to get gastric lymphoma and stomach cancer.

## **EARLY DETECTION, DIAGNOSIS, AND STAGING**

### **Can stomach cancer be found early?**

Screening is testing for a disease, such as cancer, in people without symptoms. In countries such as Japan, where stomach cancer is very common, mass screening of the population has helped find many cases at an early, curable stage. This may have reduced the number of people who die of this disease, but this has not been proven.

Studies in the United States have not found that routine screening in people at average risk for stomach cancer is useful, because this disease is not that common. On the other hand, people with certain stomach cancer risk factors may benefit from screening. If you have any questions about your stomach cancer risk or about the benefits of screening, please ask your doctor.

Some of the tests that could be used for screening, such as upper endoscopy, are described in the section "[How is stomach cancer diagnosed?](#)"

Because routine screening for stomach cancer is not done in the United States, most people with this disease are not diagnosed until they have certain [signs and symptoms](#) that point to the need for medical tests.

## TREATING STOMACH CANCER

### How is stomach cancer treated?

*This information represents the views of the doctors and nurses serving on the American Cancer Society's Cancer Information Database Editorial Board. These views are based on their interpretation of studies published in medical journals, as well as their own professional experience.*

*The treatment information in this document is not official policy of the Society and is not intended as medical advice to replace the expertise and judgment of your cancer care team. It is intended to help you and your family make informed decisions, together with your doctor.*

*Your doctor may have reasons for suggesting a treatment plan different from these general treatment options. Don't hesitate to ask him or her questions about your treatment options.*

### General treatment information

Once your cancer has been [diagnosed](#) and [staged](#), there is a lot to think about before you and your doctors choose a treatment plan. You may feel that you must make a decision quickly, but it is important to give yourself time to absorb the information you have just learned. Ask your cancer care team questions. You can find some good questions to ask in the section "[What should you ask your doctor about stomach cancer?](#)"

The main treatments for stomach cancer are:

- [Surgery](#)
- [Chemotherapy](#)
- [Targeted therapy](#)
- [Radiation therapy](#)

Often the best approach uses 2 or more of these treatment methods.

You will want to weigh the benefits of each treatment against the possible risks and side effects. Your treatment options depend on many factors. The location and the stage (extent of spread) of the tumor are very important. In choosing your treatment plan, you and your cancer care team will also take your age, general state of health, and personal preferences into account.

It is important to have a team of doctors with different specialties involved in your care before plans for treating your stomach cancer are made. Most likely, your team will include:

- A gastroenterologist: a doctor who specializes in treatment of diseases of the digestive system.
- A surgical oncologist: a doctor who treats cancer with surgery.
- A medical oncologist: a doctor who treats cancer with medicines such as chemotherapy.
- A radiation oncologist: a doctor who treats cancer with radiation therapy.

Many other specialists may be involved in your care as well, including nurse practitioners, nurses, nutrition specialists, social workers, and other health professionals.

It is important that you understand the goal of your treatment — whether it is to try to cure your cancer or to keep the cancer under control or relieve symptoms — before starting treatment. If the goal of your treatment is a cure, you will also receive treatment to relieve symptoms and side effects. If a cure is not possible, treatment is aimed at keeping the cancer under control for as long as possible and relieving symptoms, such as trouble eating, pain, or bleeding.

If time permits, you may want to get a second opinion about your treatment options. A second opinion can provide you with more information and help you feel more confident about the treatment plan that you choose.

The next few sections describe the different types of treatment for stomach cancer. This is followed by a discussion of [the most common treatment options based on the extent of the cancer](#).

## TALKING WITH YOUR DOCTOR

### What should you ask your doctor about stomach cancer?

As you cope with cancer and cancer treatment, we encourage you to talk openly with your doctor, nurse, and cancer care team. You should feel free to ask any question that's on your mind, no matter how small it might seem. Here are some questions you might want to ask. Be sure to add your own questions as you think of them. Nurses, social workers, and other members of the treatment team should also be able to answer many of your questions.

- What kind of stomach cancer do I have?
- Where is the cancer in my stomach?
- What is the stage of my cancer, and what does that mean in my case?
- Are there other tests that need to be done before we can decide on treatment?
- Will I need to see other doctors?
- How much experience do you have treating this type of cancer?
- What treatment choices do I have?
- What do you recommend and why?
- What is the goal of treatment (to cure the cancer, slow its growth, ease symptoms, etc.)?
- Are there any clinical trials I should think about now?
- How quickly do we need to decide on treatment?
- What should I do to be ready for treatment?
- How long will treatment last? What will it involve? Where will it be done?
- What risks or side effects are there to the treatments you suggest? How long are they likely to last?
- How will treatment affect my daily life? Will it affect the way I eat?
- Based on what you've learned about my cancer, what is my prognosis (outlook)?

- What type of follow-up will I need after treatment?
- What would my options be if the treatment doesn't work or if the cancer recurs?
- Where can I find more information and support?

Along with these sample questions, be sure to write down some of your own. For instance, you might want more information about recovery times, or you might want to ask about getting a second opinion.

## **AFTER TREATMENT**

### **What happens after treatment for stomach cancer?**

For some people with stomach cancer, treatment may remove or destroy the cancer. Completing treatment can be both stressful and exciting. You may be relieved to finish treatment, but find it hard not to worry about cancer coming back. (When cancer returns, it is called *recurrence*.) This is a very common concern among those who have had cancer.

It may take a while before your fears lessen. But it may help to know that many cancer survivors have learned to live with this uncertainty and are leading full lives. Our document [Living with Uncertainty: The Fear of Cancer Recurrence](#) gives more detailed information on this.

In other people, the cancer may never go away completely. These people may get regular treatments with chemotherapy, radiation therapy, or other therapies to try to help keep the cancer in check. Learning to live with cancer that does not go away can be difficult and very stressful. It has its own type of uncertainty. Our document [When Cancer Doesn't Go Away](#) talks more about this.

### **Follow-up care**

If you have completed treatment, your doctors will still want to watch you closely. It is very important to go to all of your follow-up appointments. During these visits, your doctors will ask questions about any problems you are having and may do exams and lab or imaging tests to look for signs of cancer or treatment side effects. Almost any cancer treatment can have side effects. Some last for a few weeks to months, but others can last the rest of your life. This is the time for you to talk to your cancer care team about any changes or problems you notice and any questions or concerns you have.

Most doctors recommend careful follow-up, with a physical exam and review of symptoms every 3 to 6 months for the first few years, then at least yearly after that. Lab tests might also be done. Scans are not usually needed at each visit, but should be done if there are any suspicious symptoms or physical findings.

If you have had surgery, your health care team may suggest that you meet with a nutritionist, who can help you adjust to changes in your eating habits.

People who have had surgery — especially if they had the upper part of their stomach removed (in either a subtotal or total gastrectomy) — will probably need to have their vitamin blood levels tested regularly and may need to get vitamin supplements, which may include B12 injections. (The pill form of vitamin B12 isn't absorbed if the upper part of the stomach has been removed.)

It is important to keep your [health insurance](#) during this time. Tests and doctor visits can cost a lot, and even though no one wants to think of their cancer coming back, this could happen.

Should your cancer come back, our document [When Your Cancer Comes Back: Cancer Recurrence](#) can give you information on how to manage and cope with this phase of your treatment.

### **Seeing a new doctor**

At some point after your cancer diagnosis and treatment, you may find yourself seeing a new doctor who does not know anything about your medical history. It is important that you be able to give your new doctor the details of your diagnosis and treatment. Gathering these details soon after treatment may be easier than trying to get them at some point in the future. Make sure you have the following information handy:

- A copy of your pathology report(s) from any biopsies or surgeries
- If you had surgery, a copy of your operative report(s)
- If you stayed in the hospital, a copy of the discharge summary that doctors prepare when patients are sent home
- If you had radiation therapy, a copy of the treatment summary
- If you had chemotherapy or targeted therapies, a list of the drugs, drug doses, and when you took them
- Copies of your x-rays and imaging tests (these can often be placed on a DVD)

## **WHAT'S NEW IN STOMACH CANCER RESEARCH?**

### **What's new in stomach cancer research and treatment?**

Research is always being done in the area of stomach cancer. In addition to looking for the causes and ways to prevent stomach cancer, scientists continue to look for better treatments.

### **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. Researchers have 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 drugs already known to be active against stomach cancer or other cancers. 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, but it is not yet available in the United States.

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. Several [clinical trials](#) of this approach are in progress.

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.

### 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. Other targeted drugs that are being studied against stomach cancer include sorafenib (Nexavar<sup>®</sup>) and apatinib, among others.

Most of the 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. A Korean study showed that combining chemotherapy with an immunotherapy called polyadenylic-polyuridylic acid (poly A:U) slowed stomach cancer from returning when given as adjuvant therapy after surgery. It also helped some patients live longer.

Source:

