Stomach Cancer

What is cancer?

The body is made up of trillions of living cells. Normal body cells grow, divide to make new cells, and die in an orderly fashion. During the early years of a person's life, normal cells divide faster to allow the person to grow. After the person becomes an adult, most cells divide only to replace worn-out or dying cells or to repair injuries.

Cancer begins when cells in a part of the body start to grow out of control. There are many kinds of cancer, but they all start because of out-of-control growth of abnormal cells.

Cancer cell growth is different from normal cell growth. Instead of dying, cancer cells continue to grow and form new, abnormal cells. Cancer cells can also invade (grow into) other tissues, something that normal cells cannot do. Growing out of control and invading other tissues are what makes a cell a cancer cell.

Cells become cancer cells because of damage to DNA. DNA is in every cell and directs all its actions. In a normal cell, when DNA gets damaged the cell either repairs the damage or the cell dies. In cancer cells, the damaged DNA is not repaired, but the cell doesn't die like it should. Instead, this cell goes on making new cells that the body does not need. These new cells will all have the same damaged DNA as the first cell does.

People can inherit damaged DNA, but most DNA damage is caused by mistakes that happen while the normal cell is reproducing or by something in our environment. Sometimes the cause of the DNA damage is something obvious, like cigarette smoking. But often no clear cause is found.

In most cases the cancer cells form a tumor. Some cancers, like leukemia, rarely form tumors. Instead, these cancer cells involve the blood and blood-forming organs and circulate through other tissues where they grow.

Cancer cells often travel to other parts of the body, where they begin to grow and form new tumors that replace normal tissue. This process is called metastasis. It happens when the cancer cells get into the bloodstream or lymph vessels of our body.

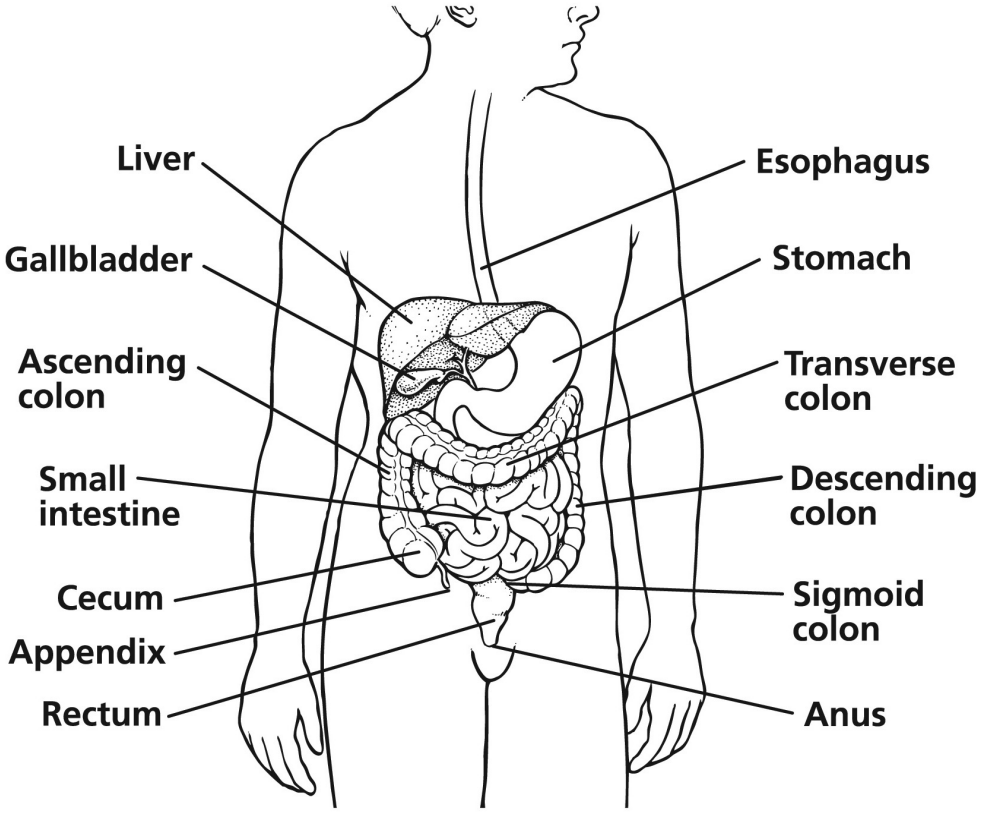
No matter where a cancer may spread, it is always named and treated based on the place where it started. For example, breast cancer that has spread to the liver is still breast cancer, not liver cancer. Likewise, prostate cancer that has spread to the bone is still prostate cancer, not bone cancer.

Different types of cancer can behave very differently. For example, lung cancer and breast cancer are very different diseases. They grow at different rates and respond to different treatments. That is why people with cancer need treatment that is aimed at their particular kind of cancer.

Not all tumors are cancerous. Tumors that aren't cancer are called benign. Benign tumors can cause problems — they can grow very large and press on healthy organs and tissues. But they cannot grow into (invade) other tissues. Because they can't invade, they also can't spread to other parts of the body (metastasize). These tumors are almost never life threatening.

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

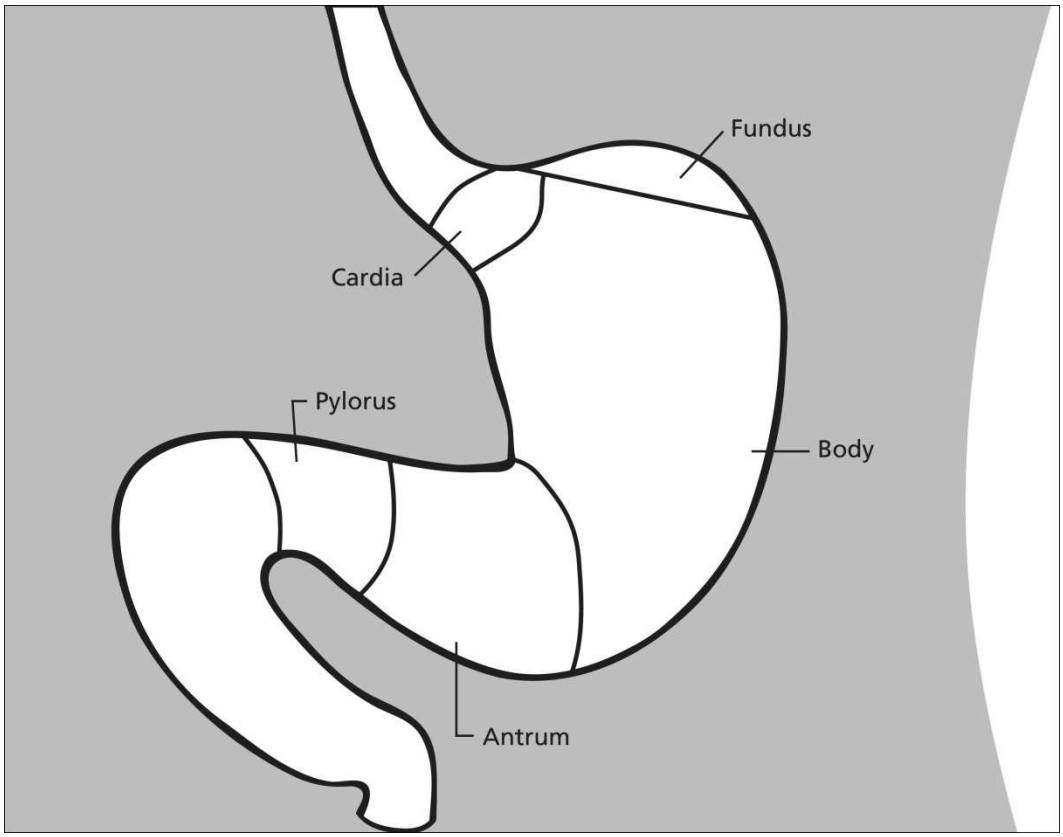
After food is chewed and swallowed, it enters the esophagus, a tube that carries food through the neck and chest to the stomach. The esophagus joins the stomach at the *gastroesophageal (GE) junction*, which is just beneath the diaphragm (the thin sheet of breathing muscle under the lungs). The stomach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



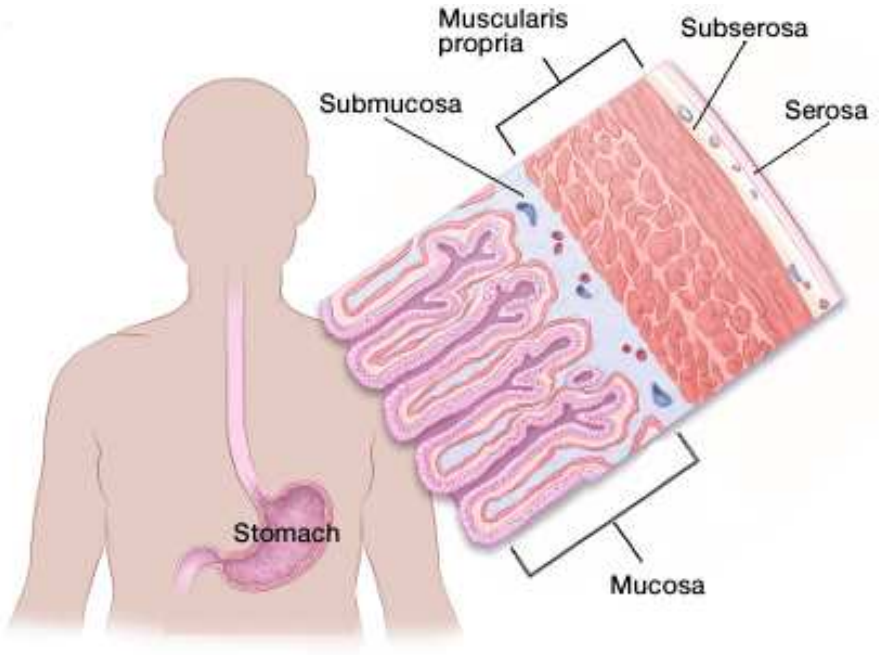
- **Cardia:** The first portion (closest to the esophagus)
- **Fundus:** The upper part of the stomach next to the cardia.
- **Body (corpus):** The main part of the stomach, between the upper and lower parts
- **Antrum:** The lower portion (near the intestine), where the food is mixed with gastric juice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

What are the key statistics about stomach cancer?

The American Cancer Society's estimates for stomach cancer in the United States for 2015 are:

- About 24,590 cases of stomach cancer will be diagnosed (15,540 in men and 9,050 in women)
- About 10,720 people will die from this type of cancer (6,500 men and 4,220 women)

Stomach cancer mostly affects older people. The average age of people when they are diagnosed is 69. About 6 of every 10 people diagnosed with stomach cancer each year are 65 or older. The average risk that a person will develop stomach cancer in their lifetime is about 1 in 111. This risk is higher in men than in women, and can also be affected by a number of other factors.

Stomach cancer is much more common in other parts of the world, particularly in less developed countries. It is a leading cause 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 the section "Survival rates for stomach cancer by stage."

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 *STK1*.

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.

Do we know what causes stomach cancer?

There are many known risk factors for stomach cancer, but it is not known exactly how these factors cause cells of the stomach lining to become cancerous. This is the subject of ongoing research.

Several changes thought to be pre-cancerous can occur in the stomach lining.

In *chronic atrophic gastritis*, the normal glands of the stomach are either decreased or absent. There is also some degree of inflammation (the stomach cells are damaged by cells of the immune system). Atrophic gastritis is often caused by *H pylori* infection. It can also be caused by an autoimmune reaction, in which a person's immune system attacks the cells lining the stomach. Some people with this condition go on to develop pernicious anemia or other stomach problems, including cancer. It is not known exactly how this condition might progress to cancer.

Another possible pre-cancerous change is *intestinal metaplasia.* In this condition, the normal lining of the stomach is replaced with cells that closely resemble the cells that usually line the intestine. People with this condition usually have chronic atrophic gastritis as well. How and why this change occurs and progresses to stomach cancer is not well understood. This might also be related to *H pylori* infection.

Recent research has provided clues on how some stomach cancers form. For instance, *H pylori* bacteria, particularly certain subtypes, can convert substances in some foods into chemicals that cause mutations (changes) in the DNA of the cells in the stomach lining. This may also explain why certain foods such as preserved meats increase a person's risk for stomach cancer. On the other hand, some of the foods that might lower stomach cancer risk, such as fruits and vegetables, contain antioxidants that can block substances that damage a cell's DNA.

During the past few years, scientists have made a lot of progress in understanding how certain changes in DNA can cause normal stomach cells to grow abnormally and form cancers. DNA is the chemical in each cell that carries our genes — the instructions for how our cells function. We look like our parents because they are the source of our DNA. But DNA affects more than how we look.

Some genes help cells grow and divide into new cells. They are called *oncogenes*. Others that slow down cell division, cause cells to die at the right time, or help fix DNA damage are called *tumor suppressor genes*. Cancers can be caused by DNA changes that turn on oncogenes or turn off tumor suppressor genes.

Inherited mutations (abnormal changes) in some genes (as explained in the section "What are the risk factors for stomach cancer?") can increase a person's stomach cancer risk. These are thought to cause only a small percentage of stomach cancers. Still, genetic testing can be done to look for the gene mutations that can cause some inherited cancer syndromes. You can read more in our document *Genetic Testing: What You Need to Know*.

Most of the gene changes that lead to stomach cancer occur after birth. Some of these changes might be caused by risk factors such as *H pylori* infection or tobacco use. But other gene changes may just be random events that sometimes happen inside cells, without having an external cause.

Can stomach cancer be prevented?

There is no sure way to prevent stomach cancer, but there are things you can do that could lower your risk.

Diet, nutrition, body weight, and physical activity

The dramatic decline of stomach cancer in the past several decades is thought to be a result of people reducing many of the known dietary risk factors. This includes greater use of refrigeration for food storage rather than preserving foods by salting, pickling, and smoking. To help reduce your risk, avoid a diet that is high in smoked and pickled foods and salted meats and fish.

A diet high in fresh fruits and vegetables can also lower stomach cancer risk. Citrus fruits (such as oranges, lemons, and grapefruit) may be especially helpful, but grapefruit and grapefruit juice can change the blood levels of certain drugs you take, so it's important to discuss this with your health care team before adding grapefruit to your diet.

The American Cancer Society recommends that people eat a healthy diet, with an emphasis on plant foods. This includes eating at least 2½ cups of vegetables and fruits every day. Choosing whole-grain breads, pastas, and cereals instead of refined grains, and eating fish, poultry, or beans instead of processed meat and red meat may also help lower your risk of cancer.

Studies that have looked at using dietary supplements to lower stomach cancer risk have had mixed results so far. Some studies have suggested that combinations of antioxidant supplements (vitamins A, C, and E and the mineral selenium) might reduce the risk of stomach cancer in people with poor nutrition to begin with. But most studies looking at people who have good nutrition have not found any benefit to adding vitamin pills to their diet. Further research in this area is needed.

Although some small studies suggested that drinking tea, particularly green tea, may help protect against stomach cancer, most large studies have not found such a link.

Being overweight or obese may add to the risk of stomach cancer. On the other hand, being physically active may help lower your risk.

The American Cancer Society recommends maintaining a healthy weight throughout life by balancing calorie intake with physical activity. Aside from possible effects on the risk of stomach cancer, losing weight and being active may also have an effect on the risk of several other cancers and health problems. The full recommendations can be found in the *American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention*.

Avoiding tobacco use

Tobacco use can increase the risk of cancers of the proximal stomach (the portion of the stomach closest to the esophagus). Tobacco use increases the risk for many other types of cancer and is responsible for about one-third of all cancer deaths in the United States. If you don't use tobacco, please don't start. If you already do and want help quitting, call the American Cancer Society at 1-800-227-2345.

Treating H pylori infection

It is not yet clear whether people whose stomach linings are chronically infected with the *H pylori* bacteria but who do not have any symptoms should be treated with antibiotics. This is a topic of current research. Some early studies have suggested that giving antibiotics to people with *H pylori* infection may lower the number of pre-cancerous lesions in the stomach and may reduce the risk of developing stomach cancer. But not all studies have found this. More research is needed to be sure that this is a way to prevent stomach cancer in people with *H pylori* infection.

If your doctor thinks you might have *H pylori* infection, there are several ways to test for this:

- The simplest way is a blood test that looks for antibodies to *H pylori*. Antibodies are proteins the body's immune system makes in response to an infection. A positive *H pylori* antibody test result can mean either that you are infected with *H pylori* or that you had an infection in the past that is now cleared.
- Another approach is to have an endoscopy procedure (see the section "How is stomach cancer diagnosed?") to take a biopsy sample of the stomach lining. This sample can be used for chemical tests for this kind of bacteria. Doctors can also identify *H pylori* in biopsy samples viewed under a microscope. The biopsy sample can also be cultured (placed in a substance that promotes bacterial growth) to see if *H pylori* grows out of the sample.
- There is also a special breath test for the bacteria. For this test, you drink a liquid containing urea. If *H pylori* is present, it will chemically change the urea. A sample of your breath is then tested for these chemical changes.

Aspirin use

Using aspirin or other non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen or naproxen, seems to lower the risk of stomach cancer. These medicines can also lower the risk of developing colon polyps and colon cancer. But they can also cause serious (and even life-threatening) internal bleeding and other potential health risks in some people.

Most doctors consider any reduced cancer risk an added benefit for patients who take these drugs for other reasons, such as to treat arthritis. But doctors do not routinely

recommend taking NSAIDs specifically to prevent stomach cancer. Studies have not yet determined for which patients the benefits of lowering cancer risk would outweigh the risks of bleeding complications.

For people at greatly increased risk

Only a small percentage of stomach cancers are caused by *hereditary diffuse gastric cancer syndrome*. But it is very important to recognize it, because most people who inherit this condition eventually get stomach cancer. A personal history of invasive lobular breast cancer before age 50 as well as having close family members who have had stomach cancer suggests that they might be at risk for having this syndrome. These people can talk to a genetics professional about getting genetic testing. If the testing shows the person has a mutation (abnormal change) in the *CDH1* gene, many doctors will recommend they have their stomach removed before the cancer develops.

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.

Signs and symptoms of stomach cancer

Unfortunately, early-stage stomach cancer rarely causes symptoms. This is one of the reasons stomach cancer is so hard to detect early. The signs and symptoms of stomach cancer can include:

- Poor appetite
- Weight loss (without trying)
- Abdominal (belly) pain

- Vague discomfort in the abdomen, usually above the navel
- A sense of fullness in the upper abdomen after eating a small meal
- Heartburn or indigestion
- Nausea
- Vomiting, with or without blood
- Swelling or fluid build-up in the abdomen
- Low red blood cell count (anemia)

Most of these symptoms are more likely to be caused by things other than cancer, such as a stomach virus or an ulcer. They may also occur with other types of cancer. But people who have any of these problems, especially if they don't go away or get worse, should check with their doctor so the cause can be found and treated.

Since symptoms of stomach cancer often do not appear until the disease is advanced, only about 1 in 5 stomach cancers in the United States is found at an early stage, before it has spread to other areas of the body.

How is stomach cancer diagnosed?

Stomach cancers are usually found when a person goes to the doctor because of signs or symptoms they are having. The doctor will take a history and examine the patient. If stomach cancer is suspected, tests will be needed to confirm the diagnosis.

Medical history and physical exam

When taking your medical history, the doctor will ask you questions about your symptoms (eating problems, pain, bloating, etc.) and possible risk factors to see if they might suggest stomach cancer or another cause. The physical exam gives your doctor information about your general health, possible signs of stomach cancer, and other health problems. In particular, the doctor will feel your abdomen for any abnormal changes.

If your doctor thinks you might have stomach cancer or another type of stomach problem, he or she will refer you to a gastroenterologist, a doctor who specializes in diseases of the digestive tract, who will examine you and do further testing.

Upper endoscopy

Upper endoscopy (also called *esophagogastroduodenoscopy* or *EGD*) is the main test used to find stomach cancer. It may be used when someone has certain risk factors or when signs and symptoms suggest this disease may be present.

During this test, the doctor passes an endoscope, which is a thin, flexible, lighted tube with a small video camera on the end, down your throat. This lets the doctor see the lining of your esophagus, stomach, and first part of the small intestine. If abnormal areas are seen, biopsies (tissue samples) can be taken using instruments passed through the endoscope. The tissue samples are sent to a lab, where they are looked at under a microscope to see if cancer is present.

When seen through an endoscope, stomach cancer can look like an ulcer, a mushroom-shaped or protruding mass, or diffuse, flat, thickened areas of mucosa known as *linitis plastica*. Unfortunately, the stomach cancers in hereditary diffuse gastric cancer syndrome often cannot be seen during endoscopy.

Endoscopy can also be used as part of a special imaging test known as *endoscopic ultrasound*, which is described below.

This test is usually done after you are given medication to make you sleepy (sedation). If sedation is used, you will need someone to take you home (not just a cab).

Endoscopic ultrasound

Ultrasound uses sound waves to produce images of organs such as the stomach. During a standard ultrasound, a wand-shaped probe called a transducer is placed on the skin. It gives off sound waves and detects the echoes as they bounce off internal organs. The pattern of echoes is processed by a computer to produce a black and white image on a screen.

In endoscopic ultrasound (EUS), a small transducer is placed on the tip of an endoscope. While you are sedated, the endoscope is passed down the throat and into the stomach. This lets the transducer rest directly on the wall of the stomach where the cancer is. It lets the doctor look at the layers of the stomach wall, as well as the nearby lymph nodes and other structures just outside the stomach. The picture quality is better than a standard ultrasound because of the shorter distance the sound waves have to travel.

EUS is most useful in seeing how far a cancer may have spread into the wall of the stomach, to nearby tissues, and to nearby lymph nodes. It can also be used to help guide a needle into a suspicious area to get a tissue sample (EUS-guided needle biopsy).

Biopsy

Your doctor may suspect cancer if an abnormal-looking area is seen on endoscopy or an imaging test, but the only way to tell for sure if it is really cancer is by doing a biopsy. During a biopsy, the doctor removes a sample of the abnormal area.

Biopsies to check for stomach cancer are most often obtained during upper endoscopy. If the doctor sees any abnormal areas in the stomach lining during the endoscopy, instruments can be passed down the endoscope to biopsy them.

Some stomach cancers are deep within the stomach wall, which can make them hard to biopsy with standard endoscopy. If the doctor suspects cancer might be deeper in the

stomach wall, endoscopic ultrasound can be used to guide a thin, hollow needle into the wall of the stomach to get a biopsy sample.

Biopsies may also be taken from areas of possible cancer spread, such as nearby lymph nodes or suspicious areas in other parts of the body.

Testing biopsy samples

Biopsy samples are sent to a lab to be looked at under a microscope. The samples are checked to see if they contain cancer, and if they do, what kind it is (for example, adenocarcinoma, carcinoid, gastrointestinal stromal tumor, or lymphoma).

If a sample contains adenocarcinoma cells, it may be tested to see if it has too much of a growth-promoting protein called HER2/neu (often just shortened to HER2). The *HER2/neu* gene instructs the cells to make this protein. Tumors with increased levels of HER2/neu are called *HER2-positive*.

Stomach cancers that are HER2-positive can be treated with drugs that target the HER2/neu protein, such as trastuzumab (Herceptin®). See the section "Targeted therapies for stomach cancer" for more information.

The biopsy sample may be tested in 2 different ways:

- Immunohistochemistry (IHC): In this test, special antibodies that stick to the HER2/neu protein are applied to the sample, which cause cells to change color if many copies are present. This color change can be seen under a microscope. The test results are reported as 0, 1+, 2+, or 3+.
- Fluorescent in situ hybridization (FISH): This test uses fluorescent pieces of DNA that specifically stick to copies of the *HER2/neu* gene in cells, which can then be counted under a special microscope.

Often the IHC test is used first.

- If the results are 0 or 1+, the cancer is HER2-negative. People with HER2-negative tumors are not treated with drugs (like trastuzumab) that target HER2.
- If the test comes back 3+, the cancer is HER2-positive. Patients with HER2-positive tumors may be treated with drugs like trastuzumab.
- When the result is 2+, the HER2 status of the tumor is not clear. This often leads to testing the tumor with FISH.

See *Testing Biopsy and Cytology Specimens for Cancer* to learn more about different types of biopsies and tests, how the tissue is used in the lab to diagnose cancer, and what the results will tell you.

Imaging tests

Imaging tests use x-rays, magnetic fields, sound waves, or radioactive substances to create pictures of the inside of your body. Imaging tests may be done for a number of reasons, including:

- To help find out whether a suspicious area might be cancerous
- To learn how far cancer may have spread
- To help determine if treatment has been effective

Upper gastrointestinal (GI) series

This is an x-ray test to look at the inner lining of the esophagus, stomach, and first part of the small intestine. This test is used less often than endoscopy to look for stomach cancer or other stomach problems, as it may miss some abnormal areas and does not allow the doctor to take biopsy samples. But it is less invasive than endoscopy, and it might be useful in some situations.

For this test, the patient drinks a white chalky solution containing a substance called *barium*. The barium coats the lining of the esophagus, stomach, and small intestine. Several x-ray pictures are then taken. Because x-rays can't pass through the coating of barium, this will outline any abnormalities of the lining of these organs.

A double-contrast technique may be used to look for early stomach cancer. With this technique, after the barium solution is swallowed, a thin tube is passed into the stomach and air is pumped in. This makes the barium coating very thin, so even small abnormalities will show up.

Computed tomography (CT or CAT) scan

The CT scan is an x-ray test that produces detailed cross-sectional images of your body. Instead of taking one picture, like a standard x-ray, a CT scanner takes many pictures as it rotates around you. A computer then combines these pictures into images of slices of the part of your body being studied.

Before the test, you may be asked to drink 1 or 2 pints of a contrast solution and/or receive an intravenous (IV) line through which a contrast dye is injected. This helps better outline structures in your body.

The IV contrast can cause some flushing (redness and warm feeling). Some people are allergic and get hives, or rarely have more serious reactions like trouble breathing and low blood pressure. Be sure to tell the doctor if you have any allergies or have ever had a reaction to any contrast material used for x-rays.

A CT scanner has been described as a large donut, with a narrow table that slides in and out of the middle opening. You will need to lie still on the table while the scan is being

done. CT scans take longer than regular x-rays, and you might feel a bit confined by the ring while the pictures are being taken.

CT scans show the stomach fairly clearly and often can confirm the location of the cancer. CT scans can also show the organs near the stomach, such as the liver, as well as lymph nodes and distant organs where cancer might have spread. The CT scan can help determine the extent (stage) of the cancer and whether surgery may be a good treatment option.

CT-guided needle biopsy: CT scans can also be used to guide a biopsy needle into a suspected area of cancer spread. The patient remains on the CT scanning table while a doctor moves a biopsy needle through the skin toward the mass. CT scans are repeated until the needle is within the mass. A fine-needle biopsy sample (tiny fragment of tissue) or a core-needle biopsy sample (a thin cylinder of tissue) is then removed and looked at under a microscope.

Magnetic resonance imaging (MRI) scan

MRI scans use radio waves and strong magnets instead of x-rays. The energy from the radio waves is absorbed by the body and then released in a pattern formed by the type of body tissue and by certain diseases. A computer translates the pattern into a very detailed image of parts of the body. A contrast material might be injected just as with CT scans, but this is used less often.

Most doctors prefer to use CT scans to look at the stomach. But an MRI may sometimes provide more information. MRIs are often used to look at the brain and spinal cord.

MRI scans take longer than CT scans, often up to an hour. You may have to lie inside a narrow tube, which is confining and can upset people with a fear of enclosed spaces. Special, open MRI machines can help with this if needed, although the images may not be as sharp in some cases. The MRI machine makes loud buzzing noises that you may find disturbing. Some places provide headphones to block this noise out.

Positron emission tomography (PET) scan

In this test, radioactive substance (usually a type of sugar related to glucose, known as FDG) is injected into a vein. (The amount of radioactivity used is very low and will pass out of the body over the next day or so.) Because cancer cells are growing faster than normal cells, they use sugar much faster, so they take up the radioactive material. After about an hour, you are moved onto a table in the PET scanner. You lie on the table for about 30 minutes while a special camera creates a picture of areas of radioactivity in the body.

PET is sometimes useful if your doctor thinks the cancer might have spread but doesn’t know where. The picture is not finely detailed like a CT or MRI scan, but it provides helpful information about the whole body. Although PET scans can be useful for finding areas of cancer spread, they aren’t always helpful in certain kinds of stomach cancer because these types don’t take up glucose very much.

Some machines can do both a PET and CT scan at the same time (PET/CT scan). This lets the doctor compare areas of higher radioactivity on the PET with the more detailed appearance of that area on the CT. PET/CT may be more helpful than PET alone for stomach cancer. This can help show if the cancer has spread beyond the stomach to other parts of the body, in which case surgery might not be a good treatment.

Chest x-ray

This test can help find out if the cancer has spread to the lungs. It might also determine if there are any serious lung or heart diseases present. This test is not needed if a CT scan of the chest has been done.

You can read more about imaging tests in our document *Imaging (Radiology) Tests*.

Other tests

Laparoscopy

If this procedure is done, it is usually only after stomach cancer has already been found. Although CT or MRI scans can create detailed pictures of the inside of the body, they can miss some tumors, especially if they are very small. Doctors might do a laparoscopy before any other surgery to help confirm a stomach cancer is still only in the stomach and can be removed completely with surgery. It may also be done before chemotherapy and/or radiation if these are planned before surgery.

This procedure is done in an operating room with the patient under general anesthesia (in a deep sleep). A laparoscope (a thin, flexible tube) is inserted through a small surgical opening in the patient's side. The laparoscope has a small video camera on its end, which sends pictures of the inside of the abdomen to a TV screen. Doctors can look closely at the surfaces of the organs and nearby lymph nodes, or even take small samples of tissue. If it doesn't look like the cancer has spread, sometimes the doctor will "wash" the abdomen with saline (salt water). The fluid (called *peritoneal washings*) is then removed and checked to see if it contains cancer cells. If it does, the cancer has spread, even if the spread couldn't be seen.

Sometimes laparoscopy is combined with ultrasound to give a better picture of the cancer.

Lab tests

When looking for signs of stomach cancer, a doctor may order a blood test called a *complete blood count (CBC)* to look for anemia (which could be caused by the cancer bleeding into the stomach). A fecal occult blood test may be done to look for blood in stool (feces) that isn't visible to the naked eye.

The doctor might recommend other tests if cancer is found, especially if you are going to have surgery. For instance, blood tests will be done to make sure your liver and kidney

functions are normal and that your blood clots normally. If surgery is planned or you are going to get medicines that can affect the heart, you may also have an electrocardiogram (EKG) and echocardiogram (an ultrasound of the heart) to make sure your heart is functioning well.

How is stomach cancer staged?

The stage of a cancer is a description of how far the cancer has spread. The stomach cancer's stage is an important factor in choosing treatment options and predicting a patient's outlook (prognosis).

There are actually 2 types of stages for stomach cancer.

The **clinical stage** of the cancer is the doctor's best estimate of the extent of the cancer, based on the results of physical exams, endoscopy, biopsies, and any imaging tests (such as CT scans) that have been done. These exams and tests are described in the section "How is stomach cancer diagnosed?"

If surgery is done, the **pathologic stage** can be determined using the same test results used for the clinical stage, plus what is found from tissues removed during surgery.

The clinical stage is used to help plan treatment. Sometimes, though, the cancer has spread further than the clinical stage estimates. Because the pathologic stage is based on what was found at surgery, it can more accurately predict the patient's outlook. The staging described here is the pathologic stage.

A staging system is a way for members of the cancer care team to describe the extent of a cancer's spread. The system most often used to stage stomach cancer in the United States is the American Joint Commission on Cancer (AJCC) TNM system. The TNM system for staging contains 3 key pieces of information:

- **T** describes the extent of the primary **t**umor (how far it has grown into the wall of the stomach and into nearby organs).
- **N** describes the spread to nearby (regional) lymph **n**odes.
- **M** indicates whether the cancer has **m**etastasized (spread) to distant parts of the body. The most common sites of distant spread of stomach cancer are the liver, the peritoneum (the lining of the space around the digestive organs), and distant lymph nodes. Less common sites of spread include the lungs and brain.

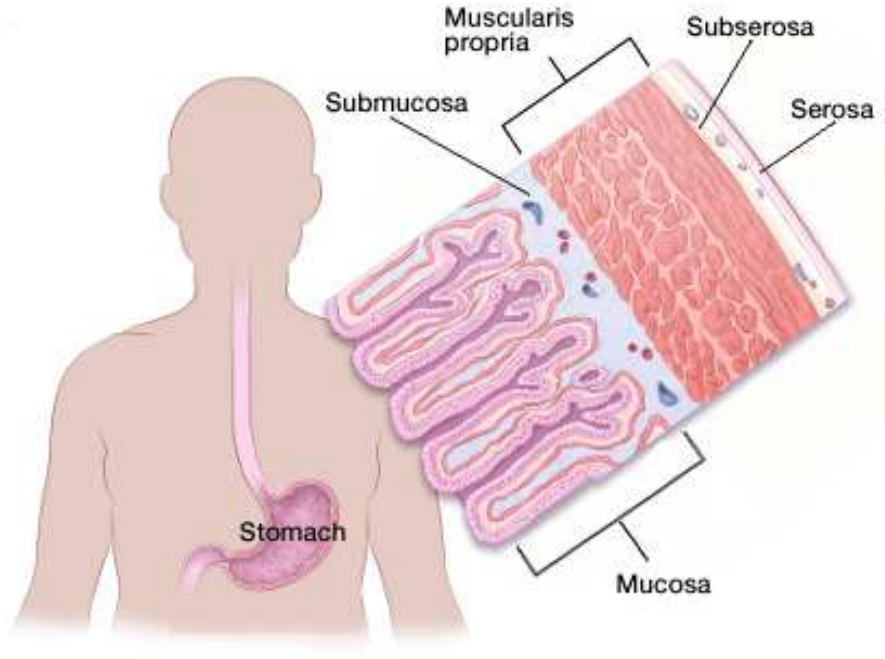
Numbers or letters appear after T, N, and M to provide more details about each of these factors:

- The numbers 0 through 4 indicate increasing severity.
- The letter X means "cannot be assessed" because the information is not available.
- The letters "is" refer to carcinoma in situ, which means the tumor is only in the top layer of mucosa cells and has not yet invaded deeper layers of tissue.

This system is for staging all stomach cancers except those starting in either the gastroesophageal junction (where the stomach and the esophagus meet) or in the cardia (the first part of the stomach) and growing into the gastroesophageal junction. Those cancers are staged (and often treated) like cancers of the esophagus. (See our document *Esophagus Cancer*)

T categories of stomach cancer

Nearly all stomach cancers start in the innermost layer of the stomach wall (the mucosa). The T category describes how far through the stomach's 5 layers the cancer has invaded.



- The innermost layer is the *mucosa*. The mucosa has 3 parts: epithelial cells, which lie on top of a layer of connective tissue (the *lamina propria*), which is on top of a thin layer of muscle (the *muscularis mucosa*).
- Under the mucosa is a supporting layer called the *submucosa*.
- Below this is the *muscularis propria*, a thick layer of muscle that moves and mixes the stomach contents.
- The next 2 layers, the *subserosa* and the outermost *serosa*, act as wrapping layers for the stomach.

TX: The main (primary) tumor cannot be assessed.

T0: No signs of a main tumor can be found.

Tis: Cancer cells are only in the top layer of cells of the mucosa (innermost layer of the stomach) and have not grown into deeper layers of tissue such as the lamina propria or muscularis mucosa. This stage is also known as *carcinoma in situ*.

T1: The tumor has grown from the top layer of cells of the mucosa into the next layers below such as the lamina propria, the muscularis mucosa, or submucosa.

- **T1a:** The tumor is growing into the lamina propria or muscularis mucosa.
- **T1b:** The tumor has grown through the lamina propria and muscularis mucosa and into the submucosa.

T2: The tumor is growing into the muscularis propria layer.

T3: The tumor is growing into the subserosa layer.

T4: The tumor has grown into the serosa and may be growing into a nearby organ (spleen, intestines, pancreas, kidney, etc.) or other structures such as major blood vessels.

- **T4a:** The tumor has grown through the stomach wall into the serosa, but the cancer hasn't grown into any of the nearby organs or structures.
- **T4b:** The tumor has grown through the stomach wall and into nearby organs or structures.

N categories of stomach cancer

NX: Nearby (regional) lymph nodes cannot be assessed.

N0: No spread to nearby lymph nodes.

N1: The cancer has spread to 1 to 2 nearby lymph nodes.

N2: The cancer has spread to 3 to 6 nearby lymph nodes.

N3: The cancer has spread 7 or more nearby lymph nodes.

- **N3a:** The cancer has spread to 7 to 15 nearby lymph nodes.
- **N3b:** The cancer has spread to 16 or more nearby lymph nodes.

M categories of stomach cancer

M0: No distant metastasis (the cancer has not spread to distant organs or sites, such as the liver, lungs, or brain).

M1: Distant metastasis (the cancer has spread to organs or lymph nodes far away from the stomach).

TNM stage grouping

Once the T, N, and M categories have been determined, this information is combined and expressed as a stage, using the number 0 (zero) and the Roman numerals I through IV. This is known as *stage grouping*. Some stages are split into substages, indicated by letters.

Stage 0: Tis, N0, M0

This is stomach cancer in its earliest stage. It has not grown beyond the inner layer of cells that line the stomach (Tis). The cancer has not spread to any lymph nodes (N0) or anywhere else (M0). This stage is also known as *carcinoma in situ*.

Stage IA: T1, N0, M0

The cancer has grown beneath the top layer of cells in the mucosa into tissue below, such as the connective tissue (lamina propria), the thin muscle layer (muscularis mucosa), or the submucosa (T1). The cancer has not spread to any lymph nodes (N0) or anywhere else (M0).

Stage IB: Any of the following:

T1, N1, M0: The cancer has grown into the layer of connective tissue (lamina propria), and may have grown into the thin layer of muscle beneath it (muscularis mucosa) or deeper into the submucosa (T1). Cancer has also spread to 1 or 2 lymph nodes near the stomach (N1), but not to any distant tissues or organs (M0).

OR

T2, N0, M0: The cancer has grown into the main muscle layer of the stomach wall, called the *muscularis propria* (T2). It has not spread to nearby lymph nodes (N0) or to any distant tissues or organs (M0).

Stage IIA: Any of the following:

T1, N2, M0: The cancer has grown beneath the top layer of cells of the mucosa into the layer of connective tissue (lamina propria), thin muscle layer (muscularis mucosa), or the submucosa (T1). It has spread to 3 to 6 nearby lymph nodes (N2). It has not spread to distant sites (M0).

OR

T2, N1, M0: The cancer has grown into the main muscle layer of the stomach called the muscularis propria (T2). It has spread to 1 or 2 nearby lymph nodes (N1), but has not spread to distant sites (M0).

OR

T3, N0, M0: The cancer has grown through the main muscle layer into the subserosa, but has not grown through all the layers to the outside the stomach (T3). It has not spread to any nearby lymph nodes (N0) or to distant tissues or organs (M0).

Stage IIB: Any of the following:

T1, N3, M0: The cancer has grown beneath the top layer of cells of the mucosa into the layer of connective tissue (lamina propria), the thin muscle layer, or the submucosa (T1). It has spread to 7 or more nearby lymph nodes (N3). It has not spread to distant tissues or organs (M0).

OR

T2, N2, M0: The cancer has grown into the main muscle layer, called the muscularis propria (T2). It has spread to 3 to 6 nearby lymph nodes (N2), but it has not spread to distant tissues or organs (M0).

OR

T3, N1, M0: The cancer has grown into the subserosa layer, but not through all the layers to the outside of the stomach (T3). It has spread to 1 or 2 nearby lymph nodes (N1), but has not spread to distant tissues or organs (M0).

OR

T4a, N0, M0: The cancer has grown completely through all the layers of stomach wall into the outer covering of the stomach (the serosa), but it has not grown into nearby organs or tissues, such as the spleen, intestines, kidneys, or pancreas (T4a). It has not spread to any nearby lymph nodes (N0) or distant sites (M0).

Stage IIIA: Any of the following:

T2, N3, M0: The cancer has grown into the main muscle layer, called the *muscularis propria* (T2). It has spread to 7 or more nearby lymph nodes (N3), but has not spread to distant tissues or organs (M0).

OR

T3, N2, M0: The cancer has grown into the subserosa layer, but not through all the layers to the outside of the stomach (T3). It has spread to 3 to 6 nearby lymph nodes (N2), but it has not spread to distant tissues or organs (M0).

OR

T4a, N1, M0: The cancer has grown completely through all the layers of the stomach wall into the outer covering of the stomach (the serosa), but it has not grown into nearby organs or tissues (T4a). It has spread to 1 or 2 nearby lymph nodes (N1), but it has not spread to distant sites (M0).

Stage IIIB: Any of the following:

T3, N3, M0: The cancer has grown into the subserosa layer, but not through all the layers to the outside of the stomach (T3). It has spread to 7 or more nearby lymph nodes (N2), but it has not spread to distant sites (M0).

OR

T4a, N2, M0: The cancer has grown completely through all the layers of the stomach wall into the serosa (the outer covering of the stomach), but it has not grown into nearby organs or tissues (T4a). It has spread to 3 to 6 nearby lymph nodes (N2), but it has not spread to distant sites (M0).

OR

T4b, N0 or N1, M0: The cancer has grown through the stomach wall and into nearby organs or structures such as the spleen, intestines, liver, pancreas, or major blood vessels (T4b). It may also have spread to up to 2 nearby lymph nodes (N0 or N1). It has not spread to distant sites (M0).

Stage IIIC: Any of the following:

T4a, N3, M0: The cancer has grown completely through all the layers of the stomach wall into the serosa, but it has not grown into nearby organs or tissues (T4a). It has spread to 7 or more nearby lymph nodes (N3), but it has not spread to distant sites (M0).

OR

T4b, N2 or N3, M0: The cancer has grown through the stomach wall and into nearby organs or structures such as the spleen, intestines, liver, pancreas, or major blood vessels (T4b). It has spread to 3 or more nearby lymph nodes (N2 or N3). It has not spread to distant sites (M0).

Stage IV: Any T, any N, M1

The cancer has spread to distant organs such as the liver, lungs, brain, or bones (M1).

If you have any questions about the stage of your disease, ask your doctor to explain this to you. The stage of a stomach cancer is an important factor, but it is not the only factor in considering treatment options and in predicting outlook for survival.

Resectable vs. unresectable cancer

The AJCC staging system provides a detailed summary of how far a stomach cancer has spread. But for treatment purposes, doctors are often more concerned about whether the tumor can be removed (resected) with surgery.

- Resectable cancers are those the doctor believes can be completely removed during surgery.

- Unresectable cancers can't be removed completely. This might be because the tumor has grown too far into nearby organs or lymph nodes, it has grown too close to major blood vessels, it has spread to distant parts of the body, or the person is not healthy enough for surgery.

There is no distinct dividing line between resectable and unresectable in terms of the TNM stage of the cancer, but earlier stage cancers are more likely to be resectable.

Survival rates for stomach cancer, by stage

Survival rates are often used by doctors as a standard way of discussing a person's prognosis (outlook). Some people with cancer may want to know the survival statistics for people in similar situations, while others may not find the numbers helpful, or may even not want to know them. If you do not want to read about the survival statistics for stomach cancer, stop reading here and skip to the next section.

The 5-year survival rate refers to the percentage of patients who live *at least* 5 years after their cancer is diagnosed. Of course, many of these people live much longer than 5 years (and many are cured).

To get 5-year survival rates, doctors have to look at people who were treated at least 5 years ago. Improvements in treatment since then may result in a better outlook for people now being diagnosed with stomach cancer.

Survival rates are often based on previous outcomes of large numbers of people who had the disease, but they cannot predict what will happen in any particular person's case. Many other factors may affect a person's outlook, such as their general health, the location of the cancer in the stomach, the treatment received, and how well the cancer responds to treatment. Your doctor can tell you how these survival rates may apply to you.

The survival rates that follow come from the National Cancer Institute's SEER database and were published in 2010 in the 7th edition of the AJCC Staging Manual. They are based on people diagnosed with stomach cancer *and treated with surgery* between 1991 and 2000. Survival rates for patients not treated with surgery are likely to be lower. It is also important to note that these are observed survival rates. People with cancer can die of other things, and these rates do not take that into account.

The rates below are based on the stage of the cancer *at the time of diagnosis*. When looking at survival rates, it's important to understand that the stage of a cancer does not change over time, even if the cancer progresses. A cancer that comes back or spreads is still referred to by the stage it was given when it was first found and diagnosed, but more information is added to explain the current extent of the cancer.

The 5-year survival rates by stage for stomach cancer treated with surgery are as follows:

Stage	5 year

	observed survival
Stage IA	71%
Stage IB	57%
Stage IIA	46%
Stage IIB	33%
Stage IIIA	20%
Stage IIIB	14%
Stage IIIC	9%
Stage IV	4%

The overall 5-year *relative* survival rate of all people with stomach cancer in the United States is about 29%. The 5-year relative survival rate compares the observed survival of people with stomach cancer to that expected for people without stomach cancer. Since some people may die from other causes, this is a better way to see the impact of cancer on survival.

This survival rate has improved gradually over the last 30 years. One reason the overall survival rate is poor in the United States is that most stomach cancers are diagnosed at an advanced rather than an early stage. The stage of the cancer has a major effect on a patient's prognosis (outlook for survival).

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.

Surgery for stomach cancer

Surgery is part of the treatment for many different stages of stomach cancer if it can be done. If a patient has a stage 0, I, II, or III cancer and is healthy enough, surgery (often along with other treatments) offers the only realistic chance for cure at this time.

Surgery may be done to remove the cancer and part or all of the stomach and some nearby lymph nodes, depending on the type and stage of stomach cancer. The surgeon will try to leave behind as much normal stomach as possible. Sometimes other organs will need to be removed as well.

Even when the cancer is too widespread to be removed completely, patients may be helped by surgery because it may help prevent bleeding from the tumor or prevent the stomach from being blocked by tumor growth. This type of surgery is called *palliative surgery*, meaning that it relieves or prevents symptoms but it is not expected to cure the cancer.

The type of operation usually depends on what part of the stomach the cancer is in and how much cancer is in the surrounding tissue. Different kinds of surgery can be used to treat stomach cancer:

Endoscopic resection

Endoscopic mucosal resection and endoscopic submucosal resection can be used only to treat some very early-stage cancers, where the chance of spread to the lymph nodes is very low.

These procedures do not require a cut (incision) in the skin. Instead, the surgeon passes an endoscope (a long, flexible tube with a small video camera on the end) down the throat and into the stomach. Surgical tools can be passed through the endoscope to remove the tumor and part of the normal stomach wall around it.

These are not done as much in the United States as they are in countries (like Japan) where stomach cancer is more common and more often found at an early stage due to screening. If you are going to have this kind of surgery, it should be at a center that has experience with this technique.

Subtotal (partial) gastrectomy

This operation is often recommended if the cancer is only in the lower part of the stomach. It is also sometimes used for cancers that are only in the upper part of the stomach.

Only part of the stomach is removed, sometimes along with part of the esophagus or the first part of the small intestine (the duodenum). The remaining section of stomach is then reattached. Some of the omentum (an apron-like layer of fatty tissue that covers the stomach and intestines) is removed as well, along with nearby lymph nodes, and possibly the spleen and parts of other nearby organs.

Eating is much easier after surgery if only part of the stomach is removed instead of the entire stomach.

Total gastrectomy

This operation is done if the cancer has spread throughout the stomach. It is also often advised if the cancer is in the upper part of the stomach, near the esophagus.

The surgeon removes the entire stomach, nearby lymph nodes, and omentum, and may remove the spleen and parts of the esophagus, intestines, pancreas, or other nearby organs. The end of the esophagus is then attached to part of the small intestine. This allows food to move down the intestinal tract. But people who have had their stomach removed can only eat a small amount of food at a time. Because of this, they must eat more often.

Most subtotal and total gastrectomies are done through a large incision (cut) in the skin of the abdomen. In some centers, they can be done using laparoscopy, which allows the stomach to be removed through several smaller cuts in the abdomen. Although this approach shows promise, many doctors feel that this needs to be studied further before it can be considered a standard treatment for stomach cancer.

Placement of a feeding tube

Some patients have trouble taking in enough nutrition after surgery for stomach cancer. Further treatment like chemotherapy with radiation can make this problem worse. To help with this, a tube can be placed into the intestine at the time of gastrectomy. The end of this tube, called a *jejunostomy* tube or *J tube*, remains outside of the skin on the abdomen. Through this, liquid nutrition can be put directly into the intestine to help prevent and treat malnutrition.

Lymph node removal

In either a subtotal or total gastrectomy, the nearby lymph nodes are removed. This is a very important part of the operation. Many doctors feel that the success of the surgery is directly related to how many lymph nodes the surgeon removes.

In the United States, it is recommended that at least 15 lymph nodes are removed (called a *D1 lymphadenectomy*) when a gastrectomy is done.. Surgeons in Japan have had very high success rates by removing even more lymph nodes near the cancer (called a *D2 lymphadenectomy*).

Surgeons in Europe and the United States have not been able to equal the results of the Japanese surgeons. It is not clear if this is because Japanese surgeons are more experienced (stomach cancer is much more common in their country), because Japanese patients tend to have earlier stage disease (because they screen for stomach cancer) and are healthier, or if other factors play a role.

In any event, it takes a skilled surgeon who is experienced in stomach cancer surgery to remove all the lymph nodes successfully. Ask your surgeon about his or her experience in operating on stomach cancer. Studies have shown that the results are better when both the surgeon and the hospital have had extensive experience in treating patients with stomach cancer.

Palliative surgery for unresectable cancer

For people with unresectable stomach cancer, surgery can often still be used to help control the cancer or to help prevent or relieve symptoms or complications.

Subtotal gastrectomy: For some people who are healthy enough for surgery, removing the part of the stomach with the tumor can help treat problems such as bleeding, pain, or blockage in the stomach, even if it does not cure the cancer. Because the goal of this surgery is not to cure the cancer, nearby lymph nodes and parts of other organs usually do not need to be removed.

Gastric bypass (gastrojejunostomy): Tumors in the lower part of the stomach may eventually grow large enough to block food from leaving the stomach. For people healthy enough for surgery, one option to help prevent or treat this is to bypass the lower part of the stomach. This is done by attaching part of the small intestine (called the jejunum) to the upper part of the stomach, which allows food to leave the stomach through the new connection.

Endoscopic tumor ablation: In some cases, such as in people who are not healthy enough for surgery, an endoscope (a long, flexible tube passed down the throat) can be used to guide a laser beam to vaporize parts of the tumor. This can be done to stop bleeding or help relieve a blockage without surgery.

Stent placement: Another option to keep a tumor from blocking the opening at the beginning or end of the stomach is to use an endoscope to place a stent (a hollow metal tube) in the opening. This helps keep it open and allows food to pass through it. For tumors in the upper (proximal) stomach, the stent is placed where the esophagus and stomach meet. For tumors in the lower (distal) part of the stomach, the stent is placed at the junction of the stomach and the small intestine.

Feeding tube placement: Some people with stomach cancer are not able to eat or drink enough to get adequate nutrition. A minor operation can be done to place a feeding tube through the skin of the abdomen and into the distal part of the stomach (known as a *gastrostomy tube* or *G tube*) or into the small intestine (known as a *jejunostomy tube* or *J tube*). Liquid nutrition can then be put directly into the tube.

Possible complications and side effects of surgery

Surgery for stomach cancer is difficult and can have complications. These can include bleeding from the surgery, blood clots, and damage to nearby organs during the operation. Rarely, the new connections made between the ends of the stomach or esophagus and small intestine may leak.

Surgical techniques have improved in recent years, so only about 1% to 2% of people die from surgery for stomach cancer. This number is higher when the operation is more extensive, such as when all the lymph nodes are removed, but it is lower in the hands of highly skilled surgeons.

You will not be allowed to eat or drink anything for at least a few days after a total or subtotal gastrectomy. This is to give the digestive tract time to heal and to make sure there are no leaks in parts that have been sewn together during the operation.

You may develop side effects after you recover from surgery. These can include nausea, heartburn, abdominal pain, and diarrhea, particularly after eating. These side effects result from the fact that once part or all of the stomach is removed, food enters the intestines too quickly after eating. The side effects often get better over time, but in some people they can last for a long time. Your doctor might prescribe medicines to help with this.

Changes in your diet will be needed after a partial or total gastrectomy. The biggest change is that you will need to eat smaller, more frequent meals. The amount of stomach removed will affect how much you need to change the way you eat.

The stomach helps the body absorb some vitamins, so people who have had a subtotal or total gastrectomy may develop vitamin deficiencies. If certain parts of the stomach are removed, doctors routinely prescribe vitamin supplements, some of which can only be injected.

Before your surgery, ask your surgeon how much of the stomach he or she intends to remove. Some surgeons try to leave behind as much of the stomach as they can to allow patients to eat more normally afterward. The tradeoff is that the cancer might be more likely to come back. The extent of the surgery should be discussed with your doctor before it is done.

It cannot be stressed enough that you should make sure your surgeon is experienced in treating stomach cancer and able to perform the most up-to-date operations to reduce your risk of complications. To learn more about surgery for cancer, see our document *A Guide to Cancer Surgery* .

Chemotherapy for stomach cancer

Chemotherapy (chemo) uses anti-cancer drugs that are injected into a vein or given by mouth as pills. These drugs enter the bloodstream and reach all areas of the body, making this treatment useful for cancer that has spread to organs beyond where it started.

Chemo can be used in different ways to help treat stomach cancer:

- Chemo can be given before surgery for stomach cancer. This, known as *neoadjuvant* treatment, can shrink the tumor and possibly make surgery easier. It may also help keep the cancer from coming back and help patients live longer. For some stages of stomach cancer, neoadjuvant chemo is one of the standard treatment options. Often, chemo is then given again after surgery.

- Chemo may be given after surgery to remove the cancer. This is called *adjuvant* treatment. The goal of adjuvant chemo is to kill any cancer cells that may have been left behind but are too small to see. This can help keep the cancer from coming back. Often, for stomach cancer, chemo is given with radiation therapy after surgery. This combination is called *chemoradiation*. This may be especially helpful for cancers that could not be removed completely by surgery.
- Chemo may be given as the primary (main) treatment for stomach cancer that has spread (metastasized) to distant organs. It may help shrink the cancer or slow its growth, which can relieve symptoms for some patients and help them live longer.

Doctors give chemo in cycles, with each period of treatment followed by a rest period to allow the body time to recover. Each cycle typically lasts for a few weeks.

A number of chemo drugs can be used to treat stomach cancer, including:

- 5-FU (fluorouracil), often given along with leucovorin (folinic acid)
- Capecitabine (Xeloda®)
- Carboplatin
- Cisplatin
- Docetaxel (Taxotere®)
- Epirubicin (Ellence®)
- Irinotecan (Camptosar®)
- Oxaliplatin (Eloxatin®)
- Paclitaxel (Taxol®)

Depending on the situation (including the stage of the cancer, the person's overall health, and whether chemo is combined with radiation therapy), these drugs may be used alone or combined with other chemotherapy or targeted drugs.

Some common drug combinations used when surgery is planned include:

- ECF (epirubicin, cisplatin, and 5-FU),which may be given before and after surgery
- Docetaxel or paclitaxel plus either 5-FU or capecitabine, combined with radiation as treatment before surgery
- Cisplatin plus either 5-FU or capecitabine, combined with radiation as treatment before surgery
- Paclitaxel and carboplatin, combined with radiation as treatment before surgery

When chemo is given with radiation after surgery, a single drug such as 5-FU or capecitabine may be used.

To treat advanced stomach cancer, ECF may also be used, but other combinations may also be helpful. Some of these include:

- DCF (docetaxel, cisplatin and 5-FU)
- Irinotecan plus cisplatin
- Irinotecan plus 5-FU or capecitabine
- Oxaliplatin plus 5-FU or capecitabine

Many doctors prefer to use combinations of 2 chemo drugs to treat advanced stomach cancer. Three-drug combinations can have more side effects, so they are usually reserved for people who are in very good health and who can be followed closely by their doctor.

Side effects of chemotherapy

Chemo drugs attack cells that are dividing quickly, which is why they work against cancer cells. But other cells in the body, such as those in the bone marrow (where new blood cells are made), the lining of the mouth and intestines, and the hair follicles, also divide quickly. These cells can also be affected by chemo, which can lead to side effects. The type of side effect depends on the type of drugs, the amount taken, and the length of treatment. Short-term side effects common to most chemotherapy drugs can include:

- Nausea and vomiting
- Loss of appetite
- Hair loss
- Diarrhea
- Mouth sores
- Increased chance of infection (from a shortage of white blood cells)
- Bleeding or bruising after minor cuts or injuries (from a shortage of platelets)
- Fatigue and shortness of breath (from a shortage of red blood cells)

These side effects are usually short-term and go away once treatment is finished. For example, hair will usually grow back after treatment ends. Be sure to tell your cancer care team about any side effects you have because there are often ways to lessen them. For example, you can be given drugs to prevent or reduce nausea and vomiting.

Some chemotherapy drugs have specific side effects. You should be given specific information about each drug you are receiving and you should review it before you start treatment.

Neuropathy: Cisplatin, oxaliplatin, docetaxel, and paclitaxel can damage nerves outside the brain and spinal cord. This can sometimes lead to symptoms (mainly in the hands and

feet) such as pain, burning or tingling sensations, sensitivity to cold or heat, or weakness. In most cases this goes away once treatment is stopped, but it may be long-lasting in some patients. Oxaliplatin can also affect nerves in the throat, causing throat pain that is worse when trying to eat or drink cold liquids or foods. This pain can lead to trouble swallowing or even breathing, and can last a few days after treatment.

Heart damage: Doxorubicin, epirubicin, and some other drugs may cause permanent heart damage if used for a long time or in high doses. For this reason, doctors carefully control the doses and use heart tests such as echocardiograms or MUGA scans to monitor heart function. Treatment with these drugs is stopped at the first sign of heart damage.

Hand-foot syndrome can occur during treatment with capecitabine or 5-FU (when given as an infusion). This starts out as redness in the hands and feet, which can then progress to pain and sensitivity in the palms and soles. If it worsens, blistering or skin peeling can occur, sometimes leading to open, painful sores. There is no specific treatment, although some creams may help. These symptoms gradually get better when the drug is stopped or the dose is decreased. The best way to prevent severe hand-foot syndrome is to tell your doctor when early symptoms come up, so that the drug dose can be changed.

To learn more about chemotherapy, see the "Chemotherapy" section of our website, or our document *A Guide to Chemotherapy*.

Targeted therapies for stomach cancer

Chemotherapy (chemo) drugs target cells that divide rapidly, which is why they often 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 drugs to try to target these differences. Targeted drugs may work in some cases when standard chemo drugs don't. They also tend to have fewer severe side effects than standard chemo drugs.

Trastuzumab

About 1 out of 5 of stomach cancers has too much of a growth-promoting protein called HER2/neu (or just HER2) on the surface of the cancer cells. Tumors with increased levels of HER2 are called *HER2-positive*.

Trastuzumab (Herceptin) is a monoclonal antibody, a man-made version of a very specific immune system protein, which targets the HER2 protein. Giving trastuzumab with chemo can help some patients with advanced, HER2-positive stomach cancer live longer than giving chemo alone.

This drug only works if the cancer cells have too much HER2, so samples of your tumor must be tested to look for HER2 before starting treatment (see "How is stomach cancer diagnosed?"). It is not used in people whose cancer is HER2-negative.

Trastuzumab is injected into a vein (IV). For stomach cancer it is given once every 2 or 3 weeks along with chemo. The best length of time to give it is not yet known.

The side effects of trastuzumab tend to be relatively mild. They can include fever and chills, weakness, nausea, vomiting, cough, diarrhea, and headache. These side effects occur less often after the first dose. This drug can also rarely lead to heart damage. The risk of heart damage is increased if trastuzumab is given with certain chemo drugs called *anthracyclines*, such as epirubicin (Ellence) or doxorubicin (Adriamycin).

Ramucirumab

In order for cancers to grow and spread, they need to create new blood vessels so that the tumors get blood and nutrients. One of the proteins that tells the body to make new blood vessels is called VEGF. VEGF binds to cell surface proteins called receptors to act. Ramucirumab (Cyramza®) is a monoclonal antibody that binds to a receptor for VEGF. This keeps VEGF from binding to the receptor and signaling the body to make more blood vessels. This can help slow or stop the growth and spread of cancer.

Ramucirumab is used to treat advanced stomach cancer, most often after another drug stops working.

This drug is given as infusion into a vein (IV) every 2 weeks.

The most common side effects of this drug are high blood pressure, headache, and diarrhea. Rare but possibly serious side effects include blood clots, severe bleeding, holes forming in the stomach or intestines (called perforations), and problems with wound healing. If a hole forms in the stomach or intestine it can lead to severe infection and may require surgery to correct.

Other targeted drugs

Other targeted therapy drugs are being tested against stomach cancer. Some of these also focus on the HER2 protein, while others have different targets. Some of these drugs are discussed in more detail in the section “What’s new in stomach cancer research and treatment?”

You can read more about targeted therapy in our document *Targeted Therapy*.

Radiation therapy for stomach cancer

Radiation therapy uses high-energy rays or particles to kill cancer cells in a specific area of the body. Radiation can be used in different ways to help treat stomach cancer:

- Before surgery for some cancers, radiation can be used along with chemotherapy (chemo) to try to shrink the tumor to make surgery easier.
- After surgery, radiation therapy can be used to kill very small remnants of the cancer that cannot be seen and removed during surgery. Radiation therapy — especially when combined with chemo drugs such as 5-FU — may delay or prevent cancer recurrence after surgery and may help patients live longer.

- Radiation therapy can be used to slow the growth and ease the symptoms of advanced stomach cancer, such as pain, bleeding, and eating problems.

External beam radiation therapy is the type of radiation therapy often used to treat stomach cancer. This treatment focuses radiation on the cancer from a machine outside the body. Often, special types of external beam radiation, such *three-dimensional conformal radiation therapy* (3D-CRT) and *intensity modulated radiation therapy* (IMRT) are used. These use computers and special techniques to focus the radiation on the cancer and limit the damage to nearby normal tissues.

Before your treatments start, the radiation team will take careful measurements to determine the correct angles for aiming the radiation beams and the proper dose of radiation. Radiation therapy is much like getting an x-ray, but the radiation is much stronger. The procedure itself is painless. Each treatment lasts only a few minutes, although the setup time — getting you into place for treatment — usually takes longer. Treatments are usually given 5 days a week over several weeks or months. Side effects from radiation therapy for stomach cancer can include:

- Skin problems, ranging from redness to blistering and peeling, in the area where the radiation passed through
- Nausea and vomiting
- Diarrhea
- Fatigue
- Low blood cell counts

These usually go away within several weeks after the treatment is finished.

When radiation is given with chemotherapy, side effects are often worse. Patients may have problems eating and getting enough fluids. Some need to have fluids given into a vein (IV) or have a feeding tube placed to get nutrition during treatment.

Please be sure to tell your doctor about any side effects you have, because there are often ways to relieve them.

Radiation might also damage nearby organs that are exposed to the beams. This could lead to problems such as heart or lung damage, or even an increased risk of another cancer later on. Doctors do everything they can to prevent this by using only the needed dose of radiation, carefully controlling where the beams are aimed, and shielding certain parts of the body from the radiation during treatment.

It is very important that you get treated at a center that has extensive experience in treating stomach cancer.

More information on radiation therapy can be found in the “Radiation” section of our website, or in our document *Understanding Radiation Therapy: A Guide for Patients and Families.*

Clinical trials for stomach cancer

You may have had to make a lot of decisions since you've been told you have cancer. One of the most important decisions you will make is choosing which treatment is best for you. You may have heard about clinical trials being done for your type of cancer. Or maybe someone on your health care team has mentioned a clinical trial to you.

Clinical trials are carefully controlled research studies that are done with patients who volunteer for them. They are done to get a closer look at promising new treatments or procedures.

If you would like to take part in a clinical trial, you should start by asking your doctor if your clinic or hospital conducts clinical trials. You can also call our clinical trials matching service for a list of clinical trials that meet your medical needs. You can reach this service at 1-800-303-5691 or on our website at www.cancer.org/clinicaltrials. You can also get a list of current clinical trials by calling the National Cancer Institute's Cancer Information Service toll-free at 1-800-4-CANCER (1-800-422-6237) or by visiting the NCI clinical trials website at www.cancer.gov/clinicaltrials.

There are requirements you must meet to take part in any clinical trial. If you qualify for a clinical trial, you get to decide whether or not to enter (enroll in) it.

Clinical trials are one way to get state-of-the art cancer treatment. In some cases they may be the only way to get access to newer treatments. They are also the only way for doctors to learn better methods to treat cancer. Still, they are not right for everyone.

You can get a lot more information on clinical trials in our document called *Clinical Trials: What You Need to Know*.

Complementary and alternative therapies for stomach cancer

When you have cancer you are likely to hear about ways to treat your cancer or relieve symptoms that your doctor hasn't mentioned. Everyone from friends and family to Internet groups and websites might offer ideas for what might help you. These methods can include vitamins, herbs, and special diets, or other methods such as acupuncture or massage, to name a few.

What exactly are complementary and alternative therapies?

Not everyone uses these terms the same way, and they are used to refer to many different methods, so it can be confusing. We use *complementary* to refer to treatments that are used *along with* your regular medical care. *Alternative* treatments are used *instead of* a doctor's medical treatment.

Complementary methods: Most complementary treatment methods are not offered as cures for cancer. Mainly, they are used to help you feel better. Some methods that are used along with regular treatment are meditation to reduce stress, acupuncture to help

relieve pain, or peppermint tea to relieve nausea. Some complementary methods are known to help, while others have not been tested. Some have been proven not be helpful, and a few have even been found harmful.

Alternative treatments: Alternative treatments may be offered as cancer cures. These treatments have not been proven safe and effective in clinical trials. Some of these methods may pose danger, or have life-threatening side effects. But the biggest danger in most cases is that you may lose the chance to be helped by standard medical treatment. Delays or interruptions in your medical treatments may give the cancer more time to grow and make it less likely that treatment will help.

Finding out more

It is easy to see why people with cancer think about alternative methods. You want to do all you can to fight the cancer, and the idea of a treatment with few or no side effects sounds great. Sometimes medical treatments like chemotherapy can be hard to take, or they may no longer be working. But the truth is that most of these alternative methods have not been tested and proven to work in treating cancer.

As you consider your options, here are 3 important steps you can take:

- Look for “red flags” that suggest fraud. Does the method promise to cure all or most cancers? Are you told not to have regular medical treatments? Is the treatment a “secret” that requires you to visit certain providers or travel to another country?
- Talk to your doctor or nurse about any method you are thinking about using.
- Contact us at 1-800-227-2345 or see the “Complementary and Alternative Medicine” section of our website to learn more about complementary and alternative methods in general and to find out about the specific methods you are looking at.

The choice is yours

Decisions about how to treat or manage your cancer are always yours to make. If you want to use a non-standard treatment, learn all you can about the method and talk to your doctor about it. With good information and the support of your health care team, you may be able to safely use the methods that can help you while avoiding those that could be harmful.

Treatment choices by type and stage of stomach cancer

Treatment of stomach cancer depends to a large degree on where the cancer started in the stomach and how far it has spread.

Stage 0

Because stage 0 cancers are limited to the inner lining layer of the stomach and have not grown into deeper layers, they can be treated by surgery alone. No chemotherapy or radiation therapy is needed.

Surgery with either subtotal gastrectomy (removal of part of the stomach) or total gastrectomy (removal of the entire stomach) is often the main treatment for these cancers. Nearby lymph nodes are removed as well.

Some small stage 0 cancers can be treated by endoscopic resection. In this procedure the cancer is removed through an endoscope passed down the throat. This is done more often in Japan, where stomach cancer is often detected early during screening. It is rare to find stomach cancer so early in the United States, so this treatment has not been used as much here. If it is done, it should be at a cancer center that has a great deal of experience with this technique.

Stage I

Stage IA: People with stage IA stomach cancer typically have their cancer removed by total or subtotal gastrectomy. The nearby lymph nodes are also removed. Endoscopic resection may rarely be an option for some small T1a cancers. No further treatment is usually needed after surgery.

Stage IB: The main treatment for this stage of stomach cancer is surgery (total or subtotal gastrectomy). Chemotherapy (chemo) or chemoradiation (chemo plus radiation therapy) may be given before surgery to try to shrink the cancer and make it easier to remove.

After surgery, patients whose lymph nodes (removed at surgery) show no signs of cancer spread are sometimes observed without further treatment, but often doctors will recommend treatment with either chemoradiation or chemo alone after surgery (especially if the patient didn't get one of these before surgery). Patients who were treated with chemo before surgery may get the same chemo (without radiation) after surgery.

If cancer is found in the lymph nodes, treatment with either chemoradiation, chemo alone, or a combination of the two is often recommended.

If a person is too sick (from other illnesses) to have surgery, they may be treated with chemoradiation if they can tolerate it. Other options include radiation therapy or chemo alone.

Stage II

The main treatment for stage II stomach cancer is surgery to remove all or part of the stomach, the omentum, and nearby lymph nodes. Many patients are treated with chemo

or chemoradiation before surgery to try to shrink the cancer and make it easier to remove. Treatment after surgery may include chemo alone or chemoradiation.

If a person is too sick (from other illnesses) to have surgery, they may be treated with chemoradiation if they can tolerate it. Other options include radiation therapy or chemo alone.

Stage III

Surgery is the main treatment for patients with this stage disease (unless they have other medical conditions that make them too ill for it). Some patients may be cured by surgery (along with other treatments), while for others the surgery may be able to help control the cancer or help relieve symptoms.

Some people may get chemo or chemoradiation before surgery to try to shrink the cancer and make it easier to remove. Patients who get chemo before surgery will probably get chemo after, as well. For patients who don't get chemo before surgery and for those who have surgery but have some cancer left behind, treatment after surgery is usually chemoradiation.

If a person is too sick (from other illnesses) to have surgery, they may be treated with chemoradiation if they can tolerate it. Other options include radiation therapy or chemo alone.

Stage IV

Because stage IV stomach cancer has spread to distant organs, a cure is usually not possible. But treatment can often help keep the cancer under control and help relieve symptoms. This might include surgery, such as a gastric bypass or even a subtotal gastrectomy in some cases, to keep the stomach and/or intestines from becoming blocked (obstructed) or to control bleeding.

In some cases, a laser beam directed through an endoscope (a long, flexible tube passed down the throat) can destroy most of the tumor and relieve obstruction without surgery. If needed, a stent (a hollow metal tube) may be placed where the esophagus and stomach meet to help keep it open and allow food to pass through it. This can also be done at the junction of the stomach and the small intestine.

Chemo and/or radiation therapy can often help shrink the cancer and relieve some symptoms as well as help patients live longer, but is usually not expected to cure the cancer. Combinations of chemo drugs are most commonly used, but which combination is best is not clear.

Targeted therapy can also be helpful in treating advanced cancers. Trastuzumab (Herceptin) can be added to chemotherapy for patients whose tumors are HER2-positive. Ramucirumab (Cyramza) may also be an option at some point. It can be given by itself or added to chemo.

Because these cancers can be hard to treat, new treatments being tested in clinical trials may benefit some patients.

Even if treatments do not destroy or shrink the cancer, there are ways to relieve pain and symptoms from the disease. Patients should tell their cancer care team about any symptoms or pain they have right way, so they can be managed effectively.

Nutrition is another concern for many patients with stomach cancer. Help is available ranging from nutritional counseling to placement of a tube into the small intestine to help provide nutrition for those who have trouble eating, if needed.

Recurrent cancer

Cancer that comes back after initial treatment is known as *recurrent cancer*. Treatment options for recurrent disease are generally the same as they are for stage IV cancers. But they also depend on where the cancer recurs, what treatments a person has already had, and the person's general health.

Clinical trials or newer treatments may be an option and should always be considered.

More treatment information for stomach cancer

For more details on treatment options — including some that may not be addressed in this document — the National Comprehensive Cancer Network (NCCN) and the National Cancer Institute (NCI) are good sources of information.

The NCCN, made up of experts from many of the nation's leading cancer centers, develops cancer treatment guidelines for doctors to use when treating patients. Those are available on the NCCN website (www.nccn.org).

The NCI provides treatment guidelines via its telephone information center (1-800-4-CANCER) and its website (www.cancer.gov). Detailed guidelines intended for use by cancer care professionals are also available on that website.

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.

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)

Lifestyle changes after stomach cancer

You can't change the fact that you have had cancer. What you can change is how you live the rest of your life — making choices to help you stay healthy and feel as well as you can. This can be a time to look at your life in new ways. Maybe you are thinking about how to improve your health over the long term. Some people even start during cancer treatment.

Making healthier choices

For many people, a diagnosis of cancer helps them focus on their health in ways they may not have thought much about in the past. Are there things you could do that might make you healthier? Maybe you could try to eat better or get more exercise. Maybe you could cut down on alcohol, or give up tobacco. Even things like keeping your stress level under control may help. Now is a good time to think about making changes that can have positive effects for the rest of your life. You will feel better and you will also be healthier.

Start by working on those things that worry you most. Get help with those that are harder for you. For instance, if you are thinking about quitting smoking and need help, call the American Cancer Society for information and support. This tobacco cessation and coaching service can help increase your chances of quitting for good.

Eating better

Eating right can be hard for anyone, but it can get even tougher during and after cancer treatment. This is especially true for cancers that affect the digestive tract, such as stomach cancer. The cancer or its treatment can affect how you eat and absorb nutrition. Nausea can be a problem from some treatments. You may lose your appetite for a while and lose weight when you don't want to.

During treatment: If you are losing weight or have trouble eating during treatment, do the best you can. Eat what appeals to you. Eat what you can, when you can. You might find it helps to eat small portions every 2 to 3 hours until you feel better. Now is not the time to restrict your diet. Try to keep in mind that these problems usually improve over time. Your cancer team may refer you to a dietitian, an expert in nutrition who can give you ideas on how to fight some of the side effects of your treatment.

After treatment: If part or all of your stomach has been removed, you might need to eat smaller amounts of food more often. Your doctor or nutritionist may also recommend that you stay upright for some time after eating. Your health care team can help you adjust your diet if you are having problems eating.

Some patients have problems with nausea, diarrhea, sweating, and flushing after eating. This is called *dumping syndrome*. When part or all of the stomach is removed, the food that is swallowed quickly passes into the intestine, leading to these symptoms after eating. These symptoms often get better over time.

Some people may need nutritional supplements to help make sure they get the nutrition they need. Some people may even need a feeding tube, usually called a *jejunostomy tube (*or *J-tube)*, put into the small intestine. This is done through a small hole in the skin over the abdomen during a minor operation. A J-tube allows liquid nutrition to be put directly into the small intestine to help prevent weight loss and improve nutrition. Less often, the tube may be placed into the lower part of the stomach instead. This is known as a *gastrostomy tube* or *G-tube*.

One of the best things you can do after cancer treatment is put healthy eating habits into place. You may be surprised at the long-term benefits of some simple changes, like increasing the variety of healthy foods you eat. Getting to and staying at a healthy weight, eating a healthy diet, and limiting your alcohol intake may lower your risk for a number of types of cancer, as well as having many other health benefits.

Rest, fatigue, and exercise

Extreme tiredness, called *fatigue*, is very common in people treated for cancer. This is not a normal tiredness, but a bone-weary exhaustion that doesn't get better with rest. For some people, fatigue lasts a long time after treatment, and can make it hard for them to exercise and do other things they want to do. But exercise can help reduce fatigue. Studies have shown that patients who follow an exercise program tailored to their personal needs feel better physically and emotionally and can cope better, too.

If you were sick and not very active during treatment, it is normal for your fitness, endurance, and muscle strength to decline. Any plan for physical activity should fit your situation. An older person who has never exercised will not be able to take on the same amount of exercise as a 20-year-old who plays tennis twice a week. If you haven't exercised in a few years, you will have to start slowly — maybe just by taking short walks.

Talk with your health care team before starting anything. Get their opinion about your exercise plans. Then, try to find an exercise buddy so you're not doing it alone. Having family or friends involved when starting a new exercise program can give you that extra boost of support to keep you going when the push just isn't there.

If you are very tired, you will need to balance activity with rest. It is OK to rest when you need to. Sometimes it's really hard for people to allow themselves to rest when they are used to working all day or taking care of a household, but this is not the time to push yourself too hard. Listen to your body and rest when you need to. (For more information on dealing with fatigue, please see *Fatigue in People With Cancer* and *Anemia in People With Cancer*.)

Keep in mind exercise can improve your physical and emotional health.

- It improves your cardiovascular (heart and circulation) fitness.
- Along with a good diet, it will help you get to and stay at a healthy weight.
- It makes your muscles stronger.
- It reduces fatigue and helps you have more energy.
- It can help lower anxiety and depression.
- It can make you feel happier.
- It helps you feel better about yourself.

And long term, we know that getting regular physical activity plays a role in helping to lower the risk of some cancers, as well as having other health benefits.

Can I lower my risk of the cancer progressing or coming back?

Most people want to know if there are specific lifestyle changes they can make to reduce their risk of their cancer progressing or coming back. Unfortunately, for most cancers there is little solid evidence to guide people. This doesn't mean that nothing will help – it's just that for the most part this is an area that hasn't been well studied. Most studies have looked at lifestyle changes as ways of preventing cancer in the first place, not slowing it down or preventing it from coming back.

At this time, not enough is known about stomach cancer to say for sure if there are things you can do that will be helpful.

Tobacco use has clearly been linked to stomach cancer, so not smoking might help reduce your risk. We don't know for certain if this will help, but we do know that it can help improve your appetite and overall health. It can also reduce the chance of developing other types of cancer. If you want to quit smoking and need help, call the American Cancer Society at 1-800-227-2345. You can also learn more in our *Guide to Quitting Smoking*.

Eating a diet rich in fruits and vegetables and staying at a healthy weight are also linked with a lower risk of stomach cancer, but again we don't know if these types of changes affect the risk of cancer progressing or coming back. However, we do know that they can have positive effects on your health that can extend beyond your risk of cancer.

How might having stomach cancer affect your emotional health?

During and after treatment, you may find yourself overcome with many different emotions. This happens to a lot of people.

You may find yourself thinking about death and dying. Or maybe you're more aware of the effect the cancer has on your family, friends, and career. You may take a new look at your relationship with those around you. Unexpected issues may also cause concern. For instance, you might see your health care team less often after treatment and have more time on your hands. These changes can make some people anxious.

Almost everyone who is going through or has been through cancer can benefit from getting some type of support. You need people you can turn to for strength and comfort. Support can come in many forms: family, friends, cancer support groups, church or spiritual groups, online support communities, or one-on-one counselors. What's best for you depends on your situation and personality. Some people feel safe in peer-support groups or education groups. Others would rather talk in an informal setting, such as church. Others may feel more at ease talking one-on-one with a trusted friend or counselor. Whatever your source of strength or comfort, make sure you have a place to go with your concerns.

The cancer journey can feel very lonely. It is not necessary or good for you to try to deal with everything on your own. And your friends and family may feel shut out if you do not include them. Let them in, and let in anyone else you feel may help. If you aren't sure who can help, call your American Cancer Society at 1-800-227-2345 and we can put you in touch with a group or resource that may work for you. You may also want to read our booklet *Distress in People with Cancer*.

If treatment for stomach cancer stops working

If cancer keeps growing or comes back after one kind of treatment, it is possible that another treatment plan might still cure the cancer, or at least shrink it enough to help you live longer and feel better. But when a person has tried many different treatments and the cancer has not gotten any better, the cancer tends to become resistant to all treatment. If this happens, it's important to weigh the possible limited benefits of a new treatment against the possible downsides. Everyone has their own way of looking at this.

This is likely to be the hardest part of your battle with cancer — when you have been through many medical treatments and nothing's working anymore. Your doctor may offer you new options, but at some point you may need to consider that treatment is not likely to improve your health or change your outcome or survival.

If you want to continue to get treatment for as long as you can, you need to think about the odds of treatment having any benefit and how this compares to the possible risks and side effects. In many cases, your doctor can estimate how likely it is the cancer will respond to treatment you are considering. For instance, the doctor may say that more treatment might have about a 1 in 100 chance of working. Some people are still tempted to try this. But it is important to think about and understand your reasons for choosing this plan.

No matter what you decide to do, you need to feel as good as you can. Make sure you are asking for and getting treatment for any symptoms you might have, such as nausea or pain. This type of treatment is called *palliative care*.

Palliative care helps relieve symptoms, but is not expected to cure the disease. It can be given along with cancer treatment, or can even be cancer treatment. The difference is its purpose — the main goal of palliative care is to improve the quality of your life, or help you feel as good as you can for as long as you can. Sometimes this means using medicines to help with symptoms like pain or nausea. Sometimes, though, the treatments used to control your symptoms are the same as those used to treat cancer. For instance, radiation might be used to help relieve pain caused by cancer that has spread. Or chemo might be used to help shrink a tumor and keep it from blocking the bowels. But this is not the same as treatment to try to cure the cancer. You can learn more about the physical and emotional changes, as well as plans and preparations for yourself and your family, in our document *Nearing the End of Life*.

At some point, you may benefit from hospice care. This is special care that treats the person rather than the disease; it focuses on quality rather than length of life. Most of the time, it is given at home. Your cancer may be causing problems that need to be managed, and hospice focuses on your comfort. You should know that while getting hospice care often means the end of treatments such as chemo and radiation, it doesn’t mean you can’t have treatment for the problems caused by your cancer or other health conditions. In hospice, the focus of your care is on living life as fully as possible and feeling as well as you can at this difficult time. You can learn more about hospice in our document *Hospice Care*.

Staying hopeful is important, too. Your hope for a cure may not be as bright, but there is still hope for good times with family and friends — times that are filled with happiness and meaning. Pausing at this time in your cancer treatment gives you a chance to refocus on the most important things in your life. Now is the time to do some things you’ve always wanted to do and to stop doing the things you no longer want to do. Though the cancer may be beyond your control, there are still choices you can make.

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®), pertuzumab (Perjeta®), and trastuzumab emtansine (Kadcyla®) 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®) 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®) 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.

You can learn more about immunotherapy in our document *Immunotherapy*.

To find a clinical trial in your area, contact the American Cancer Society at 1-800-227-2345 or go to www.cancer.org/clinicaltrials.

Additional resources for stomach cancer

More information from your American Cancer Society

Here is more information you might find helpful. You also can order free copies of our documents from our toll-free number, 1-800-227-2345, or read them on our website, www.cancer.org.

Living with cancer

Coping With Cancer in Everyday Life (also in Spanish)

Guide to Controlling Cancer Pain (also in Spanish)

Talking With Your Doctor (also in Spanish)

Distress in People With Cancer

Living With Uncertainty: The Fear of Cancer Recurrence

Understanding cancer treatments

A Guide to Cancer Surgery (also in Spanish)

A Guide to Chemotherapy (also in Spanish)

Understanding Radiation Therapy: A Guide for Patients and Families (also in Spanish)

Targeted Therapy

Immunotherapy

Cancer treatment side effects

Caring for the Patient With Cancer at Home: A Guide for Patients and Families (also in Spanish)

Nausea and Vomiting

Anemia in People With Cancer

Fatigue in People With Cancer

Peripheral Neuropathy Caused By Chemotherapy

Other health information

Nutrition for the Person With Cancer During Treatment: A Guide for Patients and Families (also in Spanish)

Clinical Trials: What You Need to Know

Health Professionals Associated With Cancer Care

Family communication and caregiver concerns

After Diagnosis: A Guide for Patients and Families (also in Spanish)

Talking With Friends and Relatives About Your Cancer (also in Spanish)

Helping Children When a Family Member Has Cancer: Dealing With Diagnosis (also in Spanish)

What It Takes to Be a Caregiver

Insurance and financial issues

In Treatment: Financial Guidance for Cancer Survivors and Their Families (also in Spanish)

Health Insurance and Financial Assistance for the Cancer Patient (also in Spanish)

Books

Your American Cancer Society also has books that you might find helpful. Call us at 1-800-227-2345 or visit our bookstore online to find out about costs or to place an order.

National organizations and Web sites*

In addition to the American Cancer Society, other sources of patient information and support include:

National Cancer Institute
Toll-free number: 1-800-422-6237 (1-800-4-CANCER)
Website: www.cancer.gov

> Offers free, accurate, up-to-date information about cancer to patients, their families, and the general public; also helps people find clinical trials in their area

National Coalition for Cancer Survivorship (NCCS)
Toll-free number: 1-888-650-9127
Toll-free number: 1-877-NCCS-YES (1-877-622-7937) (for Cancer Survivor Toolbox orders)
Website: www.canceradvocacy.org

> Offers information on work, health insurance, and more. The Cancer Survival Toolbox is a free, self-learning audio program to help cancer survivors and caregivers develop practical tools needed to deal with the diagnosis, treatment and challenges of cancer. Listen online or order CDs. Also in Spanish and Chinese.

Job Accommodation Network
Toll-free number: 1-800-526-7234
TTY: 1-877-781-9403
Website: www.askjan.org

A free consulting service of the US Department of Labor that gives information on the Americans with Disabilities Act, your rights, how to talk to an employer, and how to help keep your job (and insurance) during treatment

Cancer Legal Resource Center (CLRC)
Toll-free number: 1-866-843-2572 (1-866-THE-CLRC)
TTY: 213-736-8310
Website: www.cancerlegalresourcecenter.org

A non-profit program that gives free and confidential information and resources on cancer-related legal issues to cancer survivors, their families, friends, employers, health care professionals, and others coping with cancer

Patient Advocate Foundation
Toll-free number: 1-800-532-5274
Website: www.patientadvocate.org

Helps mediate between the patient and insurer, employer, or creditors to resolve insurance, job, or debt problems related to their cancer. Helps people get access to care and keep job and financial stability.

**Inclusion on this list does not imply endorsement by the American Cancer Society.*

No matter who you are, we can help. Contact us anytime, day or night, for information and support. Call us at **1-800-227-2345** or visit www.cancer.org.

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