Esophagus Cancer

What is cancer?

The body is made up of trillions of living cells. Normal body cells grow, divide, 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 for the place where it started. For example, breast cancer that has spread to the liver is still called breast cancer, not liver cancer. Likewise, prostate cancer that has spread to the bone is metastatic 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.

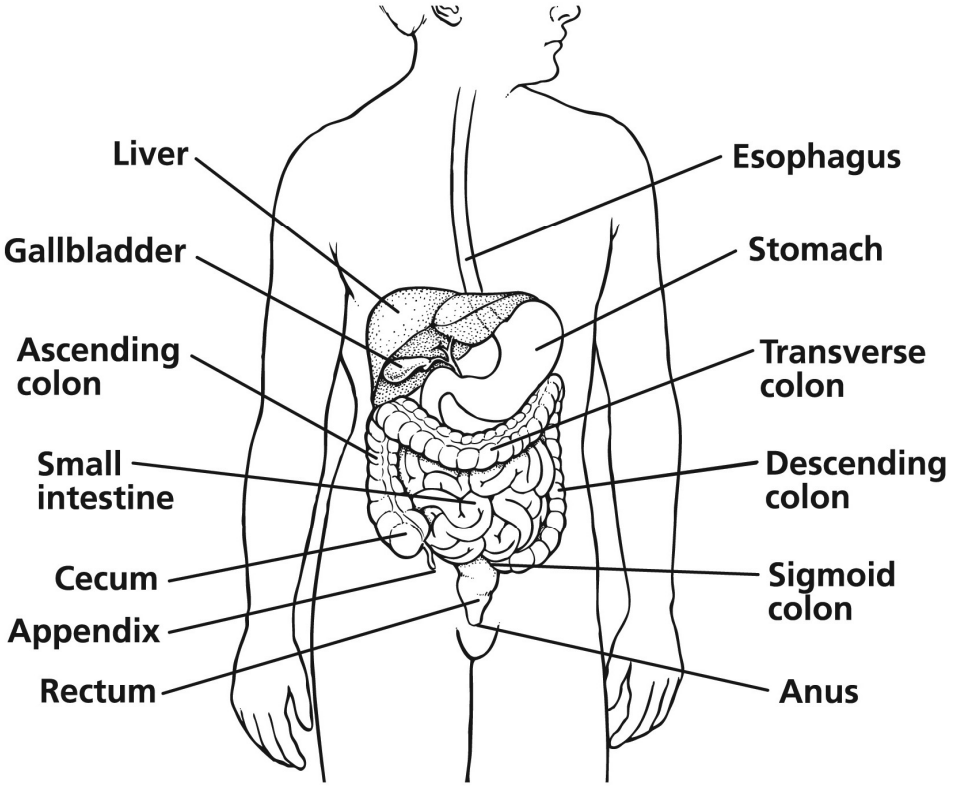
What is cancer of the esophagus?

To understand esophagus cancer, it helps to know about the normal structure and function of the esophagus.

The esophagus

The esophagus is a hollow, muscular tube that connects the throat to the stomach. It lies behind the trachea (windpipe) and in front of the spine.

Food and liquids that are swallowed travel through the inside of the esophagus (called the *lumen*) to reach the stomach. In adults, the esophagus is usually between 10 and 13 inches long and is about ¾ of an inch across at its smallest point.



The wall of the esophagus has several layers. These layers are important for understanding where cancers in the esophagus tend to start and how they may grow.

Mucosa: This is the layer that lines the inside of the esophagus. The mucosa has 3 parts:

- The *epithelium* forms the innermost lining of the esophagus and is made up of flat, thin cells called *squamous cells*. This is where most cancers of the esophagus start.
- The *lamina propria* is a thin layer of connective tissue right under the epithelium.
- The *muscularis mucosa* is a very thin layer of muscle under the lamina propria.

Submucosa: This is a layer of connective tissue just below the mucosa that contains blood vessels and nerves. In some parts of the esophagus, this layer also contains glands that secrete mucus.

Muscularis propria: This is a thick band of muscle under the submucosa. This layer of muscle contracts in a coordinated, rhythmic way to push food along the esophagus from the throat to the stomach.

Adventitia: This is the outermost layer of the esophagus, which is formed by connective tissue.

The upper part of the esophagus has a special area of muscle at its beginning that relaxes to open the esophagus when it senses food or liquid coming toward it. This muscle is called the *upper esophageal sphincter*.

The lower part of the esophagus that connects to the stomach is called the *gastroesophageal (GE) junction*. A special area of muscle near the GE junction, called the *lower esophageal sphincter*, controls the movement of food from the esophagus into the stomach and it keeps the stomach's acid and digestive enzymes out of the esophagus.

Reflux and Barrett's esophagus

The stomach has strong acid and enzymes that digest food. The epithelium (inner lining) of the stomach is made of gland cells that release acid, enzymes, and mucus. These cells have special features that protect them from the stomach's acid and digestive enzymes.

In some people, acid escapes from the stomach back into the esophagus. The medical term for this is *gastroesophageal reflux disease* (GERD), or just *reflux*. In many cases, reflux can cause symptoms such as heartburn or a burning feeling spreading out from the middle of the chest. But sometimes, reflux can occur without any symptoms at all.

If reflux of stomach acid into the lower esophagus continues for a long time, it can damage the lining of the esophagus. This causes the squamous cells that usually line the esophagus to be replaced with gland cells. These gland cells usually look like the cells that line the stomach and the small intestine and are more resistant to stomach acid. The presence of gland cells in the esophagus is known as *Barrett's (or Barrett) esophagus*.

People with Barrett's esophagus are much more likely to develop cancer of the esophagus. These people require close medical follow-up in order to find cancer early. Still, although they have a higher risk, most people with Barrett's esophagus do not go on to develop cancer of the esophagus.

Esophageal cancer

Cancer of the esophagus (also referred to as *esophageal cancer*) starts in the inner layer (the mucosa) and grows outward (through the submucosa and the muscle layer). Since 2 types of cells can line the esophagus, there are 2 main types of esophageal cancer: squamous cell carcinoma and adenocarcinoma.

The esophagus is normally lined with squamous cells. The cancer starting in these cells is called *squamous cell carcinoma*. This type of cancer can occur anywhere along the esophagus. At one time, squamous cell carcinoma was by far the more common type of esophageal cancer in the United States. This has changed over time, and now it makes up less than half of esophageal cancers in this country.

Cancers that start in gland cells are called *adenocarcinomas*. This type of cell is not normally part of the inner lining of the esophagus. Before an adenocarcinoma can develop, gland cells must replace an area of squamous cells, which is what happens in

Barrett's esophagus. This occurs mainly in the lower esophagus, which is the site of most adenocarcinomas.

Cancers that start at the area where the esophagus joins the stomach (the GE junction), which includes about the first 2 inches of the stomach (called the *cardia*), tend to behave like esophagus cancers (and are treated like them, as well), so they are grouped with esophagus cancers.

What are the key statistics about cancer of the esophagus?

The American Cancer Society's most recent estimates for esophageal cancer in the United States are for 2012:

- About 17,460 new esophageal cancer cases diagnosed (13,950 in men and 3,510 in women)
- About 15,070 deaths from esophageal cancer (12,040 in men and 3,030 in women)

This disease is 3 to 4 times more common among men than among women. The lifetime risk of esophageal cancer in the United States is about 1 in 125 in men and about 1 in 400 in women.

Overall, the rates of esophageal cancer in the United States have been fairly stable for many years. It was once more common in African Americans than in whites. But it is now about equally as common, as rates have fallen in African Americans and increased slightly in whites over the past few decades. Squamous cell carcinoma is the most common type of cancer of the esophagus among African Americans, while adenocarcinoma is more common in whites.

Cancer of the esophagus is much more common in some other countries. For example, esophageal cancer rates in Iran, northern China, India, and southern Africa are 10 to 100 times higher than in the United States. The main type of esophageal cancer in these countries is squamous cell carcinoma.

Although many people with esophageal cancer will go on to die from this disease, treatment has improved and survival rates are getting better. During the 1960s, fewer than 5% of patients survived at least 5 years after diagnosis. Now, about 15% to 20% of patients survive at least 5 years after diagnosis. This includes patients with all stages of esophageal cancer at the time of diagnosis. Survival rates for people with early stage cancer are higher. (For more information, see the section, "Survival rates for esophagus cancer by stage.")

What are the risk factors for cancer of the esophagus?

A risk factor is anything that changes your chance of getting a disease such as cancer. Different cancers have different risk factors. For example, smoking is a risk factor for lung cancer, as well as many other types of cancer.

Scientists have found several risk factors that affect your risk of cancer of the esophagus. Some are more likely to increase the risk for adenocarcinoma of the esophagus and others for squamous cell carcinoma of the esophagus.

But risk factors don't tell us everything. Having a risk factor, or even several, does not mean that you will get the disease. Many people with risk factors never develop esophagus cancer, while others with this disease may have few or no known risk factors.

Age

The chance of getting esophageal cancer is low at younger ages and increases with age. Less than 15% of cases are found in people younger than age 55.

Gender

Compared with women, men have a 3- to 4-fold higher rate of esophageal cancer.

Gastroesophageal reflux disease

In some people, acid can escape from the stomach into the esophagus. The medical term for this is *gastroesophageal reflux disease* (GERD), or just *reflux*. In many people, reflux causes symptoms such as heartburn or pain that seem to come from the middle of the chest. In some though, reflux doesn't cause any symptoms at all.

People with GERD have a higher risk of getting adenocarcinoma of the esophagus. The risk goes up based on how long the reflux has been going on and how severe the symptoms are. GERD can also cause Barrett's esophagus, which is linked to an even higher risk (discussed below).

Barrett's esophagus

If reflux of stomach acid into the lower esophagus continues for a long time, it can damage the lining of the esophagus. This causes the squamous cells that usually line the esophagus to be replaced with gland cells. These gland cells usually look like the cells that line the stomach and the small intestine, and are more resistant to stomach acid. This condition is known as Barrett's (or Barrett) esophagus.

The longer someone has reflux, the more likely it is that they will develop Barrett's esophagus. Most people with Barrett's esophagus have had symptoms of "heartburn," but many have no symptoms at all.

Barrett's esophagus increases the risk of adenocarcinoma of the esophagus. This is because the gland cells in Barrett's esophagus can become more abnormal over time. This can result in *dysplasia*, a pre-cancerous condition. Dysplasia is graded by how abnormal the cells look under the microscope. High-grade dysplasia is the most abnormal.

People with Barrett's esophagus are much more likely than people without this condition to develop esophageal cancer. Still, most people with Barrett's esophagus do not get esophageal cancer. The risk of cancer is even higher if dysplasia is present.

Tobacco and alcohol

The use of tobacco products, including cigarettes, cigars, pipes, and chewing tobacco, is a major risk factor for esophageal cancer. The risk goes up with increased use: the more a person uses tobacco and the longer it is used, the higher the cancer risk. Someone who smokes a pack of cigarettes a day or more has at least twice the chance of getting adenocarcinoma of the esophagus than a nonsmoker. The link to squamous cell esophageal cancer is even stronger. The risk of esophageal cancer goes down if tobacco use stops.

Drinking alcohol also increases the risk of esophageal cancer. The chance of getting esophageal cancer goes up with higher intake of alcohol. Alcohol affects the risk of the squamous cell type more than the risk of adenocarcinoma.

Combining smoking and drinking alcohol raises the risk of esophageal cancer much more than using either alone.

Obesity

People who are overweight or obese (very overweight) have a higher chance of getting adenocarcinoma of the esophagus. This is in part explained by the fact that people who are obese are more likely to have esophageal reflux.

Diet

A diet high in fruits and vegetables is linked to a lower risk of esophageal cancer. The exact reasons for this are not clear, but fruits and vegetables provide a number of vitamins and minerals that may help prevent cancer.

On the other hand, certain substances in the diet may increase the cancer risk. For example, there have been suggestions, as yet unproven, that a diet high in processed meat may increase the chance of developing esophageal cancer. This may help explain the high rate of this cancer in certain parts of the world.

Drinking very hot liquids frequently may increase the risk for the squamous cell type of esophageal cancer. This may be the result of long-term damage the liquids do to the cells lining the esophagus.

Overeating, which leads to obesity, increases the risk of the adenocarcinoma of the esophagus.

Achalasia

In this condition, the muscle at the lower end of the esophagus (the lower esophageal sphincter) does not relax properly. Food and liquid that are swallowed have trouble passing into the stomach and tend to collect in the esophagus, which becomes stretched out (dilated) over time. The cells lining the esophagus can become irritated from being exposed to foods for longer than normal amounts of time.

People with achalasia have a risk of esophageal cancer that is many times normal. On average, the cancers are found about 15 to 20 years after the achalasia is diagnosed.

Tylosis

This is a rare, inherited disease that causes excess growth of the top layer of skin on the palms of the hands and soles of the feet. People with this condition also develop small growths (papillomas) in the esophagus and have a very high risk of getting squamous cell cancer of the esophagus.

People with tylosis need to be watched closely to try to find esophageal cancer early. Often this requires regular monitoring with an upper endoscopy (described in "How is esophagus cancer diagnosed?").

Esophageal webs

A web is a thin membrane extending out from the inner lining of the esophagus that causes an area of narrowing. Most esophageal webs do not cause any problems, but larger webs may cause food to get stuck in the esophagus, which can lead to problems swallowing.

When an esophageal web is found along with anemia, tongue irritation (glossitis), brittle fingernails, and a large spleen it is called *Plummer-Vinson syndrome*. Another name for this is *Paterson-Kelly syndrome*. About 1 in 10 patients with this syndrome eventually develop squamous cell cancer of the esophagus.

Workplace exposures

Exposure to chemical fumes in certain workplaces may lead to an increased risk of esophageal cancer. For example, exposure to the solvents used for dry cleaning may lead to a greater risk of esophageal cancer. Some studies have found that dry cleaning workers may have a higher rate of esophageal cancer.

Injury to the esophagus

Lye is a chemical found in strong industrial and household cleaners such as drain cleaners. Lye is a corrosive agent, meaning it can burn and destroy cells. Sometimes small children mistakenly drink from a lye-based cleaner bottle. The lye causes a severe chemical burn in the esophagus. As the injury heals, the scar tissue can cause an area of the esophagus to become very narrow (called a *stricture*). People with these strictures have an increased rate of the squamous cell type of esophageal cancer as adults. The cancers occur on average about 40 years after the lye was swallowed.

History of certain other cancers

People who have had certain other cancers, such as lung cancer, mouth cancer, and throat cancer have a high risk of getting squamous cell carcinoma of the esophagus as well. This may be because all of these cancers can be caused by smoking.

Do we know what causes cancer of the esophagus?

We do not yet know exactly what causes most esophageal cancers. However, there are certain risk factors that make getting esophageal cancer more likely (see the section, "What are the risk factors for cancer of the esophagus?").

Scientists believe that some risk factors, such as the use of tobacco or alcohol, may cause esophageal cancer by damaging the DNA of cells that line the inside of the esophagus. Long-term irritation of the lining of the esophagus, as happens with reflux, Barrett's esophagus, achalasia, esophageal webs, or scarring from swallowing lye, may also lead to DNA damage.

DNA is the chemical in each of our cells that makes up our *genes* – the instructions for how our cells function. We usually look like our parents because they are the source of our DNA. However, DNA affects more than how we look. Some genes have instructions for controlling when cells grow and divide. Genes that promote cell division are called *oncogenes*. Genes that slow down cell division or cause cells to die at the right time are called *tumor suppressor genes*. Cancers can be caused by DNA changes that turn on oncogenes or turn off tumor suppressor genes.

The DNA of esophageal cancer cells often shows changes in many different genes. However, it's not clear if there are specific gene changes that can be found in all (or most) cases of this cancer.

Can cancer of the esophagus be prevented?

Not all cases of esophageal cancer can be prevented, but the risk of developing this disease can be greatly reduced by avoiding certain risk factors.

In the United States, the most important lifestyle risk factors for cancer of the esophagus are the use of tobacco and alcohol. Each of these factors alone increases the risk of esophageal cancer many times, and the risk is even greater if they are combined. Avoiding tobacco and alcohol is one of the best ways of limiting your risk of esophageal cancer.

Eating a healthy diet and maintaining a healthy weight are also important. A diet rich in fruits and vegetables may help protect against esophageal cancer. Obesity has been linked with esophageal cancer, particularly the adenocarcinoma type, so maintaining a healthy weight may also help limit the risk of this disease.

Some studies have found that the risk of cancer of the esophagus is lower in people who take aspirin or other non-steroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen. However, taking these drugs every day can lead to problems, such as kidney damage and bleeding in the stomach. For this reason, most doctors do not advise the use of NSAIDs to try to prevent cancer. If you are thinking of using an NSAID regularly, you first should discuss the potential benefits and risks with your doctor.

People at increased risk for esophageal cancer, such as those with Barrett's esophagus, are often followed closely by their doctors to look for signs that the cells lining the esophagus have become more abnormal (see "Can esophagus cancer be found early?"). If dysplasia (a pre-cancerous condition) is found, the doctor may recommend treatments to keep it from progressing to esophageal cancer.

Treating people with reflux may help prevent Barrett's esophagus and esophageal cancer. Often, reflux is treated using drugs called proton pump inhibitors (PPIs), such as omeprazole (Prilosec®), lansoprazole (Prevacid®), or esomeprazole (Nexium®). Surgery is also an option for treating reflux. For those who already have Barrett's esophagus, treatment with a high dose of a PPI may lower the risk of developing cell changes that can turn into cancer (dysplasia). If you have chronic heartburn (or reflux), you should tell your doctor. Treatment can often improve symptoms and may prevent future problems.

Can cancer of the esophagus be found early?

Looking for a disease in someone without symptoms is called *screening*. The goal of screening is to find a disease like cancer in an early, more curable stage, in order to help people live longer, healthier lives.

In the United States, screening the general public for esophageal cancer is not recommended by any professional organization at this time. This is because no screening test has been shown to lower the risk of dying from esophageal cancer in people who are at average risk.

However, people who have a high risk of esophageal cancer, such as those with Barrett's esophagus, are often followed closely to look for early cancers and pre-cancers.

Testing for people at high risk

Many experts recommend that people with a high risk of esophageal cancer, such as those with Barrett's esophagus, have upper endoscopy regularly. For this test, the doctor looks at the inside of the esophagus through a flexible lighted tube called an endoscope (see "How is esophagus cancer diagnosed?"). If an abnormal area is seen, a small sample of tissue is removed from that area and checked to see if it contains cancer cells.

Doctors are not certain how often the test should be repeated, but most recommend testing more often if areas of abnormal cells (called *dysplasia*) are found. This testing is repeated even more often if there is high-grade dysplasia (the cells appear very abnormal).

If the area of Barrett's is large and/or there are many different spots of high-grade dysplasia, surgery to remove the abnormal area is often advised because of the high risk that an adenocarcinoma is either already present (but was not found) or will develop within a few years. If treated with surgery, the outlook for these patients is relatively good.

Surgery may not be an option for some patients if they are in poor health and aren't able to withstand the operation. Other treatment options for high-grade dysplasia include endoscopic mucosal resection (EMR), photodynamic therapy (PDT), and radiofrequency ablation. These are discussed in the "Endoscopic treatments" section of this document.

Careful monitoring and treatment (if needed) may help prevent some esophageal cancers from developing. It may also detect some cancers early, when they are more likely to be treated successfully.

How is cancer of the esophagus diagnosed?

Esophagus cancers are usually found because of signs or symptoms a person is having. If esophagus cancer is suspected, tests will be needed to confirm the diagnosis.

Signs and symptoms of esophageal cancer

In most cases, cancers of the esophagus are found because of the symptoms they cause. Diagnosis in people without symptoms is rare and usually accidental (because of tests done to check other medical problems). Unfortunately, most esophageal cancers do not cause symptoms until they have reached an advanced stage, when they are harder to treat.

Trouble swallowing

The most common symptom of esophageal cancer is a problem swallowing, with the feeling like the food is stuck in the throat or chest. The medical term for this is *dysphagia*. This is often mild when it starts, and then gets worse over time as the opening inside the esophagus gets narrower. Dysphagia is commonly a late symptom caused by a large cancer.

When swallowing becomes difficult, people often change their diet and eating habits without realizing it. They take smaller bites and chew their food more carefully and slowly. As the cancer grows larger, the problem gets worse. People then may start eating softer foods that can pass through the esophagus more easily. They may avoid bread and meat, since these foods typically get stuck. The swallowing problem may even get bad enough that some people stop eating solid food completely and switch to a liquid diet. To help pass food through the esophagus, the body makes more saliva. This causes some people to complain of bringing up lots of thick mucus or saliva. If the cancer keeps growing, at some point even liquids will not be able to pass.

Chest pain

Sometimes, people complain of pain or discomfort in the middle part of their chest. Some people describe a feeling of pressure or burning in the chest. These symptoms are more often caused by problems other than cancer, such as heartburn, and so they are rarely seen as a signal that a person may have cancer.

Swallowing may become painful when the cancer is large enough to limit the passage of food through the esophagus. Pain may be felt a few seconds after swallowing, as food or liquid reaches the tumor and has trouble getting past it.

Weight loss

About half of patients with esophageal cancer lose weight (without trying to). This happens because their swallowing problems keep them from eating enough to maintain their weight. Other factors include a decreased appetite and an increase in metabolism from the cancer.

Other symptoms

Other possible symptoms with cancer of the esophagus can include:

- Hoarseness
- Constant cough
- Hiccups
- Pneumonia
- Bone pain
- Bleeding into the esophagus. This blood then passes through the digestive tract, which may turn stools black. Over time, this blood loss can lead to anemia (low red blood cell levels), which may make a person feel tired.

Having one or more of the symptoms above does not mean you have esophageal cancer. In fact, many of these symptoms are more likely to be caused by other conditions. Still, if

you have any of these symptoms, especially trouble swallowing, it is very important to have them checked by a doctor so that the cause can be found and treated, if needed.

Medical history and physical exam

If you have symptoms that may be caused by esophageal cancer, the doctor will ask about your medical history to check for possible risk factors and to learn more about your symptoms. Your doctor will also examine you to look for possible signs of esophageal cancer and other health problems. He or she will probably pay special attention to your neck and chest areas.

If the results of the exam are abnormal, your doctor will likely order tests to help find the problem. You may also be referred to a gastroenterologist (a doctor specializing in diseases of digestive tract).

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 both before and after a diagnosis of esophageal cancer, including:

- To help find a suspicious area that might be cancerous
- To learn how far cancer may have spread
- To help determine if treatment has been effective
- To look for possible signs of cancer recurrence after treatment

Barium swallow

In this test, a thick, chalky liquid called *barium* is swallowed to coat the walls of the esophagus. X-rays of the esophagus are then taken, which the barium outlines clearly. This test can be done by itself, or as a part of a series of x-rays that includes the stomach and part of the intestine, called an *upper gastrointestinal (GI) series*. A barium swallow test can show any irregularities in the normally smooth surface of the inner lining of the esophagus.

This is often the first test done to see what is causing a problem with swallowing. Even small, early cancers can often be seen using this test. Tumors grow out from the lining of the esophagus and stick out into the lumen (the open area of the tube). They cause the barium to coat that area of the esophagus unevenly. Early cancers can look like small round bumps or flat, raised areas (called *plaques*), while advanced cancers look like large irregular areas and cause a narrowing of the width of the esophagus.

This test can also be used to diagnose one of the more serious complications of esophageal cancer called a *tracheo-esophageal fistula*. This occurs when the tumor destroys the tissue between the esophagus and the trachea (windpipe) and creates a hole

connecting them. Anything that is swallowed can then pass from the esophagus into the windpipe and lungs. This can lead to frequent coughing, gagging, or even pneumonia. This problem can be helped with surgery or an endoscopy procedure.

A barium swallow only shows the shape of the inner lining of the esophagus, so it cannot be used to determine how far a cancer may have spread outside of the esophagus.

Computed tomography (CT or CAT) scan

The CT scan is a test that uses x-rays to produce detailed cross-sectional images of your body. Instead of taking one picture, like a standard x-ray does, a CT scanner takes many pictures of the part of your body being studied as it rotates around you. A computer then combines these pictures into an image of a slice of your body. Unlike a regular x-ray, a CT scan creates detailed images of the soft tissues and organs in the body.

CT scans are not usually used to make the initial diagnosis of esophageal cancer, but they can help see how far it has spread. CT scans often can show where the cancer is in the esophagus. These scans can also show the nearby organs and lymph nodes (bean-sized collections of immune cells to which cancers often spread first), as well as distant areas of cancer spread. The CT scan can help to determine whether surgery is a good treatment option.

Before any pictures are taken, you may be asked to drink 1 to 2 pints of a liquid called *oral contrast*. This helps outline the esophagus and intestines so that certain areas are not mistaken for tumors. If you are having any trouble swallowing, you need to tell your doctor before the scan. You may also receive an IV (intravenous) line through which a different kind of contrast dye (IV contrast) is injected. This helps better outline structures in your body.

The injection can cause some flushing (redness and warm feeling, especially in the face). Some people are allergic to the dye and get hives. Rarely, more serious reactions like trouble breathing and low blood pressure can occur. You can be given medicine to prevent and treat allergic reactions. Be sure to tell your doctor if you have any allergies or have ever had a reaction to any contrast material used for x-rays.

CT scans take longer than regular x-rays. You will need to lie still on a table while they are being done. During the test, the table slides in and out of the scanner, a ring-shaped machine that completely surrounds the table. You might feel a bit confined by the ring you have to lie in while the pictures are being taken. *Spiral CT* (also known as helical CT) is now used in many medical centers. This type of CT scan uses a faster machine that reduces the dose of radiation and yields more detailed pictures.

CT-guided needle biopsy: CT scans can also be used to guide a biopsy needle precisely into a suspected area of cancer spread. For this procedure, the patient remains on the CT scanning table while a radiologist advances a biopsy needle through the skin and toward the tumor. CT scans are repeated until the needle is within the mass. A fine needle biopsy sample or a larger core needle biopsy sample is then removed to be looked at under a microscope.

Magnetic resonance imaging (MRI) scan

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

MRI scans are very helpful in looking at the brain and spinal cord, but they are not often needed to assess spread of esophageal cancer.

MRI scans are a little more uncomfortable than CT scans. First, they take longer – often up to an hour. Second, you have to lie inside a narrow tube, which is confining and can upset people with claustrophobia (a fear of enclosed spaces). Newer, more open MRI machines can sometimes help with this if needed, although the images may not be as sharp in some cases. MRI machines make buzzing and clicking noises that you may find disturbing. Some centers provide earplugs to help block this noise out.

Positron emission tomography (PET) scan

For a PET scan, a form of radioactive sugar (known as fluorodeoxyglucose or FDG) is injected into the blood. The amount of radioactivity used is very low. Cancer cells in the body are growing rapidly, so they absorb large amounts of the radioactive sugar. After about an hour, you will be 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. The picture is not finely detailed like a CT or MRI scan, but it provides helpful information about your whole body.

This type of scan may be used to look for possible areas of cancer spread if nothing is found on other imaging tests.

Some newer machines are able to perform 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.

Endoscopy

An endoscope is a flexible, narrow tube with a video camera and light on the end that is used to look inside the body. Several tests that use endoscopes can help diagnose esophageal cancer or determine the extent of its spread.

Upper endoscopy

This is an important test for diagnosing esophageal cancer. During an upper endoscopy, you are sedated (made sleepy) and then the doctor passes the endoscope down the throat and into the esophagus and stomach. The camera is connected to a monitor, which lets the doctor see any abnormal areas in the wall of the esophagus clearly.

The doctor can use special instruments through the scope to remove (biopsy) samples from any abnormal areas. These samples are sent to the lab so that a doctor can look at them under a microscope to see if cancer is present.

If the esophageal cancer is blocking the opening (called the *lumen*) of the esophagus, certain instruments can be used to help enlarge the opening to help food and liquid pass.

Upper endoscopy can give the doctor important information about the size and spread of the tumor, which can be used to help determine if the tumor can be completely removed with surgery.

Endoscopic ultrasound

This is actually a type of imaging test that involves the use of endoscopy. Ultrasound tests use sound waves to take pictures of parts of the body. They use no radiation and are very safe.

For an endoscopic ultrasound, the probe that gives off the sound waves is at the end of an endoscope, which is passed down the throat and into the esophagus. This allows the probe to get very close to the cancer. This is done with numbing medicine (local anesthesia) and light sedation.

The probe sends out sound waves, which bounce off normal tissue and any cancer that is present. The echoes are picked up by the probe and a computer turns the pattern of sound waves into a black-and-white image. The picture shows how deeply the tumor has invaded into the esophagus. It can detect small abnormal changes very well.

This test is very useful in determining the size of an esophageal cancer and how far it has grown into nearby tissues. It can also help determine if nearby lymph nodes might be affected by the cancer. If enlarged lymph nodes are seen on the ultrasound and not beside the tumor, the doctor may use a thin, hollow needle to get biopsy samples of them. This helps the doctor decide if the tumor can be surgically removed.

Bronchoscopy

This exam may be done for cancer in the upper part of the esophagus to see if it has spread to the windpipe (trachea) or the tubes leading from the trachea into the lung (bronchi). For this test, a lighted, flexible fiber-optic tube (bronchoscope) is passed through your mouth or nose and down into the windpipe and bronchi. The mouth and throat are sprayed first with a numbing medicine. You may also be given medicine through an intravenous (IV) line to make you feel relaxed.

If abnormal areas are seen, small instruments can be passed down the bronchoscope to take biopsy samples.

Thoracoscopy and laparoscopy

These procedures allow the doctor to see lymph nodes and other organs near the esophagus inside the chest (by thoracoscopy) or the abdomen (by laparoscopy) through a hollow lighted tube.

These procedures are done in an operating room while you are under general anesthesia (in a deep sleep). A small cut (incision) is made in the side of the chest wall (for thoracoscopy) or the abdomen (for laparoscopy). Sometimes more than one cut is made. The doctor then inserts a thin, lighted tube with a small video camera on the end through the incision to view the space around the esophagus. The surgeon can pass thin instruments into the space to remove lymph node samples and take biopsies to see if the cancer has spread. This information is often important in deciding whether or not a person is likely to benefit from surgery.

Lab testing of biopsy samples

An area seen on endoscopy or on an imaging test may look like cancer, but the only way to know for sure is to do a biopsy. For a biopsy, the doctor removes small pieces of tissue from an area that looks abnormal. This is most often done during an endoscopy exam.

A doctor called a *pathologist* then looks at the tissue under a microscope to see if any cancer cells are present. If there is cancer, the pathologist will determine the type (adenocarcinoma or squamous cell) and the grade of the cancer (how abnormal the patterns of cells look under the microscope). For details about grading, see the next section "How is cancer of the esophagus staged?" It takes at least a couple of days to get the results of a biopsy.

HER2 testing: If esophageal cancer is found but is too advanced for surgery, your doctor may have your biopsy samples tested for the HER2 protein. Some people with esophageal cancer have too much of the HER2 protein on the surface of their cancer cells, which helps the cells grow. However, a drug that targets the HER2 protein, known as trastuzumab (Herceptin), may help treat these cancers when used along with chemotherapy. Only cancers that have too much of the HER2 protein are likely to be affected by this drug, which is why doctors may test tumor samples for it. (See the "Targeted therapy for esophagus cancer" section for more information on this treatment.)

Other tests

When looking for signs of esophageal cancer, a doctor may order a blood test called a complete blood count (CBC) to look for anemia (which could be caused by internal bleeding). A fecal occult blood test may be done to look for blood in stool (feces).

If esophageal cancer is found, the doctor may recommend other tests, especially if surgery may be an option. For instance, blood tests can be done to make sure your liver and kidney functions are normal. Tests may also be done to check your lung function, since some people may have lung problems (such as pneumonia) after surgery. If surgery is planned or you are going to get medicines that may affect the heart, you may also have

an electrocardiogram (EKG) and echocardiogram (ultrasound of the heart) to make sure your heart is functioning well.

How is cancer of the esophagus staged?

Staging is the process of finding out how far a cancer has spread. The stage of esophageal cancer is a standard summary of how far the cancer has spread. The treatment and outlook for people with esophageal cancer depend, to a large extent, on the cancer's stage.

Esophageal cancer is staged based on the results of exams, imaging tests, endoscopies, and biopsies, which are described in “How is cancer of the esophagus diagnosed?”

TNM staging system

The most common system used to stage esophageal cancer is the TNM system of the American Joint Committee on Cancer (AJCC). The TNM system is based on several key pieces of information:

- **T** refers to how far the primary **tumor** has grown into the wall of the esophagus and into nearby organs.
- **N** refers to cancer spread to nearby lymph **nodes**.
- **M** indicates whether the cancer has **metastasized** (spread to distant organs).
- **G** describes the **grade** of the cancer, which is based on how the patterns of cancer cells look under a microscope.

Staging also takes into account the cell type of the cancer (squamous cell carcinoma or adenocarcinoma). For squamous cell cancers, the location of the tumor can also be a factor in staging.

T categories

This describes how deeply the cancer has grown into the wall of the esophagus or into nearby structures. Most esophageal cancers start in the innermost lining of the esophagus (the epithelium) and then grow into deeper layers over time. (See "What is esophagus cancer?" for a description of the layers of the esophagus wall.)

TX: The primary tumor can't be assessed.

T0: There is no evidence of a primary tumor.

Tis: The cancer is only in the epithelium (the top layer of cells lining the inside of the esophagus). It has not started growing into the deeper layers. This stage is also known as *high-grade dysplasia*. In the past it was called carcinoma in situ.

T1: The cancer is growing into the tissue under the epithelium, such as the lamina propria, muscularis mucosa, or submucosa.

T2: The cancer is growing into the thick muscle layer (muscularis propria).

T3: The cancer is growing into the outer layer of the esophagus (the adventitia).

T4: The cancer is growing into nearby structures.

> **T4a:** The cancer is growing into the pleura (the tissue covering the lungs), the pericardium (the tissue covering the heart), or the diaphragm (the thin sheet of muscle below the lungs that separates the chest from the abdomen). The cancer can be removed with surgery.
>
> **T4b:** The cancer cannot be removed with surgery because it has grown into the trachea (windpipe), the aorta (the large blood vessel coming from the heart), the spine, or other crucial structures.

N categories

NX: Nearby lymph nodes can't be assessed.

N0: The cancer has not spread to nearby lymph nodes.

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

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

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

M categories

M0: The cancer has not spread (metastasized) to distant organs or lymph nodes.

M1: The cancer has spread to distant lymph nodes and/or other organs.

Grade

The grade of a cancer is based on how normal (or differentiated) the cells look under the microscope. The higher the number, the more abnormal the cells look. Higher grade tumors tend to grow and spread faster than lower grade tumors.

GX: The grade cannot be assessed (treated in stage grouping as G1).

G1: The cells are well-differentiated.

G2: The cells are moderately differentiated

G3: The cells are poorly differentiated

G4: The cells are undifferentiated (these cells are so abnormal that doctors can't tell if they are adenocarcinoma or squamous cell carcinoma). For staging, G4 cancers are grouped with G3 squamous cell cancers.

Location

Some stages of early squamous cell carcinoma also take into account where the tumor is in the esophagus. The location is assigned as either *upper*, *middle*, or *lower* based on where the upper edge of the tumor is.

Stage grouping

Once the T, N, M, and G categories have been assigned, this information is combined to assign an overall stage of 0, I, II, III, or IV. This process is called stage grouping. Some stages are further subdivided into A, B, or C. The stages identify cancers that have a similar prognosis (outlook). Patients with lower stage numbers tend to have a better prognosis.

The stage groupings for squamous cell carcinoma and adenocarcinoma are different. Cancers that have features of both squamous cell and adenocarcinoma are staged as squamous cell carcinomas.

Squamous cell carcinoma stages

Stage 0: Tis, N0, M0, GX or G1; any location: This is the earliest stage of esophageal cancer. The cancer cells are found only in the epithelium (the layer of cells lining the esophagus). The cancer has not grown into the connective tissue beneath these cells (Tis). The cancer has not spread to lymph nodes (N0) or other organs (M0). This stage is also called *high-grade dysplasia*. The tumor is well differentiated (G1) or grade information is not available (GX) and can be anywhere along the esophagus.

Stage IA: T1, N0, M0, GX or G1; any location: The cancer has grown from the epithelium into the layers below, such as the lamina propria, muscularis mucosa, or submucosa, but it has not grown any deeper (T1). It has not spread to lymph nodes (N0) or to distant sites (M0). The tumor is well differentiated (G1) or grade information is not available (GX). It can be anywhere along the esophagus.

Stage IB: Either of the following:

T1, N0, M0, G2 or G3; any location: The cancer has grown from the epithelium into the layers below, such as the lamina propria, muscularis mucosa, or submucosa, but it has not grown any deeper (T1). It has not spread to lymph nodes (N0) or to distant sites (M0). It is moderately (G2) or poorly differentiated (G3). The tumor can be anywhere in the esophagus.

T2 or T3, N0, M0, GX or G1; location lower: The cancer has grown into the muscle layer called the muscularis propria (T2). It may also have grown through the muscle layer into the adventitia, the connective tissue covering the outside of the esophagus (T3). The cancer has not spread to lymph nodes (N0) or to distant sites (M0). It is well differentiated (G1) or grade information is not available (GX). Its highest point is in the lower part of the esophagus.

Stage IIA: Either of the following:

T2 or T3, N0, M0, GX or G1; location upper or middle: The cancer has grown into the muscle layer called the muscularis propria (T2). It may also have grown through the muscle layer into the adventitia, the connective tissue covering the outside of the esophagus (T3). The cancer has not spread to lymph nodes (N0) or to distant sites (M0).The cancer is in the upper or middle part of the esophagus and is well differentiated (G1) or grade information is not available (GX).

T2 or T3, N0, M0, G2 or G3; location lower: The cancer has grown into the muscle layer called the muscularis propria (T2). It may also have grown through the muscle layer into the adventitia, the connective tissue covering the outside of the esophagus (T3). The cancer has not spread to lymph nodes (N0) or to distant sites (M0).The cancer is in the lower part of the esophagus and is moderately (G2) or poorly differentiated (G3).

Stage IIB: Either of the following:

T2 or T3, N0, M0, G2 or G3; location upper or middle: The cancer has grown into the muscle layer called the muscularis propria (T2). It may also have grown through the muscle layer into the adventitia, the connective tissue covering the outside of the esophagus (T3). The cancer has not spread to lymph nodes (N0) or to distant sites (M0). It is in the upper or middle part of the esophagus and is moderately (G2) or poorly differentiated (G3).

T1 or T2, N1, M0, any G; any location: The cancer has grown into the layers below the epithelium, such as the lamina propria, muscularis mucosa, or submucosa (T1). It may also have grown into the muscularis propria (T2). It has not grown through to the outer layer of tissue covering the esophagus. It has spread to 1 or 2 lymph nodes near the esophagus (N1) but has not spread to lymph nodes further away from the esophagus or to distant sites (M0). It can be any grade and can be anywhere along the esophagus.

Stage IIIA: Any of the following:

T1 or T2, N2, M0, any G; any location: The cancer has grown into the layers below the epithelium, such as the lamina propria, muscularis mucosa, or submucosa (T1). It may also have grown into the muscularis propria (T2). It has not grown through to the outer layer of tissue covering the esophagus. It has spread to 3 to 6 lymph nodes near the esophagus (N2) but has not spread to lymph nodes farther away from the esophagus or to distant sites (M0). It can be any grade and can be anywhere along the esophagus.

T3, N1, M0, any G; any location: The cancer has grown through the wall of the esophagus to its outer layer, the adventitia (T3). It has spread to 1 or 2 lymph nodes near the esophagus (N1), but has not spread to lymph nodes farther away from the esophagus or to distant sites (M0). It can be any grade and can be anywhere along the esophagus.

T4a, N0, M0, any G; any location: The cancer has grown all the way through the esophagus and into nearby organs or tissues (T4a) but still can be removed. It has not spread to nearby lymph nodes (N0) or to distant sites (M0). It can be any grade and can be anywhere along the esophagus.

Stage IIIB: T3, N2, M0, any G; any location: The cancer has grown through the wall of the esophagus to its outer layer, the adventitia (T3). It has spread to 3 to 6 lymph nodes near the esophagus (N2), but has not spread to lymph nodes farther away from the esophagus or to distant sites (M0). It can be any grade and can be anywhere along the esophagus.

Stage IIIC: Any of the following:

T4a, N1 or N2, M0, any G; any location: The cancer has grown all the way through the esophagus and into nearby organs or tissues (T4a) but still can be removed. It has spread to 1 to 6 lymph nodes near the esophagus (N1 or N2), but has not spread to lymph nodes farther away from the esophagus or to distant sites (M0). It can be any grade and can be anywhere along the esophagus.

T4b, any N, M0, any G; any location: The cancer cannot be removed with surgery because it has grown into the trachea (windpipe), the aorta (the large blood vessel coming from the heart), the spine, or other crucial structures (T4b). It may or may not have spread to nearby lymph nodes (any N), but it has not spread to lymph nodes farther away from the esophagus or to distant sites (M0). It can be any grade and can be anywhere along the esophagus.

Any T, N3, M0, any G; any location: The cancer has spread to 7 or more nearby lymph nodes (N3), but has not spread to lymph nodes farther away from the esophagus or to distant sites (M0). It can be any grade and can be anywhere along the esophagus.

Stage IV: Any T, any N, M1, any G; any location: The cancer has spread to distant lymph nodes or other sites (M1). It can be any grade and can be anywhere along the esophagus.

Adenocarcinoma stages

The location of the cancer along the esophagus does not affect the stage of adenocarcinomas.

Stage 0: Tis, N0, M0, GX or G1: This is the earliest stage of esophageal cancer. This stage is also called *high-grade dysplasia*. The cancer cells are only found in the epithelium (the layer of cells lining of the esophagus). The cancer has not grown into the connective tissue beneath these cells. The cancer has not spread to lymph nodes or other organs. It is well differentiated (G1) or grade information is not available (GX).

Stage IA: T1, N0, M0, GX, G1, or G2: The cancer has grown from the epithelium into the layers below, such as the lamina propria, muscularis mucosa, or submucosa, but it has not grown any deeper (T1). It has not spread to lymph nodes (N0) or to distant sites (M0). It is well (G1) or moderately differentiated (G2), or grade information is not available (GX).

Stage IB: Either of the following:

T1, N0, M0, G3: The cancer has grown from the epithelium into the layers below, such as the lamina propria, muscularis mucosa, or submucosa, but it has not grown any deeper

(T1). It has not spread to lymph nodes (N0) or to distant sites (M0). It is poorly differentiated (G3).

T2, N0, M0, GX, G1, or G2: The cancer has grown into the muscle layer called the muscularis propria (T2). It has not spread to lymph nodes (N0) or to distant sites (M0). It is well (G1) or moderately differentiated (G2), or grade information is not available (GX).

Stage IIA: T2, N0, M0, G3: The cancer has grown into the muscle layer called the muscularis propria (T2). It has not spread to lymph nodes (N0) or to distant sites (M0). It is poorly differentiated (G3).

Stage IIB: Either of the following:

T3, N0, M0, any G: The cancer has grown through the wall of the esophagus to its outer layer, the adventitia (T3). It has not spread to lymph nodes (N0) or to distant sites (M0). It can be any grade.

T1 or T2, N1, M0, any G: The cancer has grown into the layers below the epithelium, such as the lamina propria, muscularis mucosa, or submucosa (T1). It may also have grown into the muscularis propria (T2). It has not grown through to the outer layer of tissue covering the esophagus. It has spread to 1 or 2 lymph nodes near the esophagus (N1), but has not spread to lymph nodes farther away from the esophagus or to distant sites (M0). It can be any grade.

Stage IIIA: Any of the following:

T1 or T2, N2, M0, any G: The cancer has grown into the layers below the epithelium, such as the lamina propria, muscularis mucosa, or submucosa (T1). It may also have grown into the muscularis propria (T2). It has not grown through to the outer layer of tissue covering the esophagus. It has spread to 3 to 6 lymph nodes near the esophagus (N2) but has not spread to lymph nodes farther away from the esophagus or to distant sites (M0). It can be any grade.

T3, N1, M0, any G: The cancer has grown through the wall of the esophagus to its outer layer, the adventitia (T3). It has spread to 1 or 2 lymph nodes near the esophagus (N1), but has not spread to lymph nodes farther away from the esophagus or to distant sites (M0). It can be any grade.

T4a, N0, M0, any G: The cancer has grown all the way through the esophagus and into nearby organs or tissues (T4a) but still can be removed. It has not spread to nearby lymph nodes or to distant sites (M0). It can be any grade.

Stage IIIB: T3, N2, M0, any G: The cancer has grown through the wall of the esophagus to its outer layer, the adventitia (T3). It has spread to 3 to 6 lymph nodes near the esophagus (N2), but has not spread to lymph nodes farther away from the esophagus or to distant sites (M0). It can be any grade.

Stage IIIC: Any of the following:

T4a, N1 or N2, M0, any G: The cancer has grown all the way through the esophagus and into nearby organs or tissues (T4a) but still can be removed. It has spread to 1 to 6 lymph nodes near the esophagus (N1 or N2), but has not spread to lymph nodes farther away from the esophagus or to distant sites (M0). It can be any grade.

T4b, any N, M0, any G: The cancer cannot be removed with surgery because it has grown into the trachea (windpipe), the aorta (the large blood vessel coming from the heart), the spine, or other crucial structures (T4b). It may or may not have spread to nearby lymph nodes (any N), but has not spread to lymph nodes farther away from the esophagus or to distant sites (M0). It can be any grade.

Any T, N3, M0, any G: The cancer has spread to 7 or more nearby lymph nodes (N3), but has not spread to lymph nodes farther away from the esophagus or to distant sites (M0). It can be any grade.

Stage IV: Any T, any N, M1, any G: The cancer has spread to distant lymph nodes or other sites (M1). It can be any grade.

Resectable versus unresectable cancer

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

As a general rule, as long as a person is healthy enough for surgery, all stage 0, I, and II esophageal cancers are potentially resectable. Most stage III cancers are resectable as well, even with spread to nearby lymph nodes, as long as the cancer has not grown into the trachea (windpipe), the aorta (the large blood vessel coming from the heart), the spine, or other nearby crucial structures. Unfortunately, many people whose cancer is considered resectable may not be healthy enough to withstand surgery.

Cancers that have grown into these structures or that have spread to distant lymph nodes or to other organs are considered unresectable, so treatments other than surgery are usually the best option.

Survival rates for esophagus cancer by stage

Survival rates are often used by doctors as a standard way of discussing a person's prognosis (outlook). Some patients 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. Whether or not you want to read about the survival statistics below for esophagus cancer is up to you.

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 longer than 5 years.

Five-year *relative* survival rates, such as the numbers below, assume that some people will die of other causes and compare the observed survival with that expected for people

without the cancer. This is a more accurate way to describe the chances of dying from a particular type and stage of cancer.

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

Survival rates are not readily available for each stage in the AJCC staging system for esophageal cancer. The survival rates below come from the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) database, and are based on patients who were diagnosed with esophageal cancer between 2001 and 2007. The SEER database does not divide survival rates by AJCC stage. Instead, this database divides cancers into 3 larger, summary stages:

- **Localized** means that the cancer is only growing in the esophagus. It includes AJCC stage I and some stage II tumors (such as those that are T1, T2, or T3, N0, M0). Stage 0 cancers are not included in these statistics.
- **Regional** means that the cancer has spread to nearby lymph nodes or tissues. This includes T4 tumors and cancers with lymph node spread (N1, N2, or N3).
- **Distant** means that the cancer has spread to organs or lymph nodes away from the tumor, and includes all M1 (stage IV) cancers.

Stage	**5-Year Relative Survival Rate**
Localized	37%
Regional	18%
Distant	3%

These survival rates for esophageal cancer do not separate squamous cell carcinomas from adenocarcinomas, although adenocarcinomas are generally thought to have a slightly better prognosis (outlook) overall.

Survival rates are often based on previous outcomes of large numbers of people who had the disease, but they cannot predict what will happen to any particular person. Knowing the type and the stage of a person's cancer is important in estimating their outlook. But many other factors may also affect a person's outlook, such as how well the cancer responds to treatment and a person's overall health. Even when taking these other factors into account, survival rates are at best rough estimates. Your doctor can tell you how well the numbers above may apply to you.

How is cancer of the esophagus 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

After the cancer is found and staged, the cancer care team will discuss a treatment plan or treatment options with you. It is important that you take time to think about all of the choices. In selecting a treatment plan, the 2 main factors to consider are your overall health and the stage (extent) of the cancer.

The main options for treatment of cancer of the esophagus include surgery, chemotherapy, and radiation therapy. Other treatments, such as endoscopic mucosal resection, radiofrequency ablation, and photodynamic therapy, may be used for early cancers and pre-cancers of the esophagus. Some of these treatments can also be used as palliative treatment when all the cancer cannot be removed. Palliative treatment is meant to relieve symptoms, such as pain and trouble swallowing, but it is not expected to cure the cancer.

Depending on the stage of the cancer and your general medical condition, different treatment options may be used alone or in combination. Based on these options, you may have different types of doctors on your treatment team. These doctors may include:

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

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 to discuss all treatment options as well as their possible side effects with your doctors to help make the decision that best fits your needs. If time permits, it is often a good idea to seek a second opinion. A second opinion can provide more information and help you feel confident about the chosen treatment plan.

The next few sections describe the different types of treatment for esophagus cancer. This is followed by a discussion of the most common treatment options based on the stage of the cancer.

Surgery for esophagus cancer

For some earlier stage cancers, surgery may be used to try to remove the cancer and some of the normal surrounding tissue. In some cases, it might be combined with other treatments, such as chemotherapy and/or radiation therapy.

Esophagectomy

Surgery to remove some or most of the esophagus is called an esophagectomy. Often a small part of the stomach is removed as well. The upper part of the esophagus is then connected to the remaining part of the stomach. Part of the stomach is pulled up into the chest or neck to become the new esophagus. How much of the esophagus is removed depends upon the stage of the tumor and where it's located.

If the cancer is in the lower part of the esophagus (near the stomach) or at the place where the esophagus and stomach meet (the gastroesophageal or GE junction), the surgeon will remove part of the stomach, the part of the esophagus containing the cancer, and about 3 to 4 inches of normal esophagus above this. Then the stomach is connected to what is left of the esophagus either high in the chest or in the neck.

If the tumor is in the upper or middle part of the esophagus, most of the esophagus will need to be removed to be sure to get enough tissue above the cancer. The stomach will then be brought up and connected to the esophagus in the neck. If the stomach cannot be used to replace the esophagus, the surgeon may use a piece of the intestine instead. When a piece of intestine is used, it must be moved without damaging its blood vessels. If the vessels are damaged, not enough blood will get to that piece of intestine, and the tissue will die.

Esophagectomy may be done using either of 2 main types of techniques. The standard, open technique uses one or more large incisions (cuts) in the neck, chest, or abdomen to perform the surgery. In minimally invasive surgery, the surgeon operates through several smaller incisions using special long, thin surgical instruments.

Open esophagectomy: Many different approaches can be used in operating on esophageal cancer. For a *transthoracic esophagectomy*, the esophagus is removed with the main incisions in the abdomen and the chest. If the main incisions are in the abdomen and neck, it is called a *transhiatal esophagectomy*. Some approaches use incisions in the neck, chest, and abdomen. You and your surgeon should discuss in detail the operation planned for you and what you can expect. The surgeon may use pictures to describe how the operation will be done.

Minimally invasive esophagectomy: For some early (small) cancers, the esophagus can be removed through several small incisions instead of 1 or 2 large incisions. The surgeon puts a scope (like a tiny telescope) through one of the incisions to see everything during

the operation. Then the surgical instruments go in through other small incisions. In order to do this type of procedure well, the surgeon needs to be highly skilled and have a great deal of experience removing the esophagus this way. Because it uses smaller incisions, minimally invasive esophagectomy may allow the patient to leave the hospital sooner and recover faster.

No matter which approach is used, esophagectomy is not a simple operation, and it may require a long hospital stay.

If the cancer has not yet spread beyond the esophagus, removing the esophagus may cure the cancer. Unfortunately, most esophageal cancers are not found early enough for doctors to cure them with surgery.

Lymph node removal

For either type of esophagectomy, nearby lymph nodes are removed during the operation as well. These are then checked to see of they contain cancer cells. If the cancer has spread to lymph nodes, the outlook is not as good, and the doctor may recommend other treatments (like chemotherapy and/or radiation) after surgery.

Risks and side effects of surgery

Like most serious operations, surgery of the esophagus has some risks. A heart attack or a blood clot in the lungs or the brain can occur during or after the operation. Infection is a risk with any surgery.

Lung complications are common. Pneumonia may develop, leading to a longer hospital stay, and sometimes even death.

There may be a leak at the place where the stomach is connected to the esophagus, which might require another operation to fix. This complication is not as common as it used to be because of improvements in surgical techniques.

After the operation, the stomach may empty too slowly because the nerves that control its contractions can be affected by surgery. This can, in a few cases, lead to frequent nausea and vomiting.

Strictures (narrowing) can form where the esophagus is surgically connected to the stomach, which may cause problems swallowing for some patients. To relieve this symptom, these strictures can be expanded during an upper endoscopy procedure.

After surgery, bile and stomach contents can enter the esophagus because the lower esophageal sphincter is often removed or changed by the surgery. This can cause symptoms such as heartburn. Sometimes antacids or motility drugs can help relieve these symptoms.

Some of these complications may be fatal. The risk of dying from this operation is related to the doctor's experience with these procedures. In general, the best outcomes are achieved with surgeons and hospitals that have the most experience. This is why patients

should not hesitate to ask the surgeon about his or her experience: how often they operate on the esophagus, how many times they have done this procedure, and what percentage of their patients have died after this surgery. The hospital where the surgery is done is also important, and any hospital that you consider should be willing to show you survival statistics.

Radiation therapy for esophagus cancer

Radiation therapy is the use of high-energy radiation to kill cancer cells. It is often combined with other types of treatment, such as chemotherapy and/or surgery, to treat esophageal cancer. Radiation therapy may be used:

- As part of the primary (main) treatment of esophageal cancer in some patients, typically along with chemotherapy. This is often used for people who can't have surgery due to poor health. In fact, some doctors think radiation therapy combined with chemotherapy can be as effective as surgery.
- Before surgery (usually along with chemotherapy), to try to shrink the cancer and make it easier to remove (called *neoadjuvant treatment*).
- After surgery (usually along with chemotherapy), to try to kill any areas of cancer cells that may have been left behind but are too small to see. This is known as *adjuvant therapy*.
- To ease the symptoms of advanced esophageal cancer such as pain, bleeding, or trouble swallowing. This is called *palliative therapy*.

There are 2 main types of radiation therapy.

External-beam radiation therapy: This type of treatment focuses radiation from outside the body on the cancer. This is the type of radiation therapy most often used when the intent is to try to cure esophageal cancer.

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 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. Most often, radiation treatments are given 5 days a week for several weeks.

Internal radiation therapy (brachytherapy): For this type of treatment, the doctor places radioactive material very close to the cancer through an endoscope. The radiation travels only a short distance, so it reaches the tumor but has little effect on nearby normal tissues. The radioactive source is then removed a short time later. Brachytherapy can be given 2 ways:

For *high-dose rate (HDR) brachytherapy*, the doctor leaves the radioactive material near the tumor for a few minutes at a time, which may require several treatments.

In *low-dose rate (LDR) brachytherapy*, a lower dose of radiation is put near the tumor for longer periods (1 or 2 days) at a time. This requires that the patient stay in the hospital during treatment, but it can usually be completed in only 1 or 2 treatments.

Brachytherapy is most often used with more advanced esophageal cancers to shrink tumors so a patient can swallow more easily. This technique cannot be used to treat a very large area, so it is better used as a way to relieve symptoms (and not to try to cure the cancer).

Possible side effects of radiation therapy

Side effects of external radiation therapy may include:

- Skin changes ranging from sunburn-like to blistering and open sores
- Nausea and vomiting
- Diarrhea
- Fatigue
- Painful sores in the mouth and throat
- Dry mouth or thick saliva

These side effects are often worse if chemotherapy is given at the same time as radiation.

During treatment with either external radiation or brachytherapy, the radiation kills the normal cells in the lining, which can lead to painful swallowing. This starts shortly after beginning treatment but typically improves within a few weeks of finishing.

Most side effects of radiation are temporary, but some rare serious side effects can be permanent. For example, in some cases radiation can cause a stricture (narrowing) in the esophagus, which may require further treatment. Radiation to the chest can also cause lung damage, which may lead to problems breathing and shortness of breath.

Talk with your doctor before and during treatment about what side effects you can expect and any ways that they could be reduced.

Chemotherapy for esophagus cancer

Chemotherapy (chemo) uses drugs that are given through a vein or by mouth to treat cancer. These drugs enter the bloodstream and reach all areas of the body, making this treatment useful for cancer that has spread. Depending on the type and stage of esophageal cancer, chemotherapy may be given:

- As part of the main (primary) treatment, along with radiation therapy.
- Before surgery (usually along with radiation therapy) to try to shrink the cancer and make it easier to remove. This is called *neoadjuvant treatment*.

- After the cancer has been removed by surgery (usually along with radiation therapy) to try to kill any small areas of tumor cells that may have been left behind. This is known as *adjuvant treatment*.
- Alone or with radiation to help control symptoms like pain or trouble swallowing when the cancer can't be cured. This is called *palliative treatment*.

Chemotherapy by itself rarely cures esophageal cancer. It is often given together with radiation therapy. This combination (called *chemoradiation* or *chemoradiotherapy*) can be useful for large tumors that couldn't be removed otherwise. It can shrink the tumor enough for surgery to be an option. Chemoradiation is also often used before surgery for smaller tumors. Using chemoradiation and surgery may help people live longer than using just surgery. Chemoradiation can also be given after surgery.

In some cases, chemoradiation may be used as the only treatment. This may be a good choice for patients who cannot have surgery because they have other major health problems. This may also be an option for some patients who could have surgery. Some studies have shown that chemoradiation may be as effective as the main treatment as surgery.

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

Many different chemotherapy drugs can be used to treat esophageal cancer. Common regimens are:

- Cisplatin and 5-fluorouracil (5-FU) (often combined with radiation)
- ECF: epirubicin (Ellence®), cisplatin, and 5-FU (especially for gastroesophageal junction tumors)
- DCF: docetaxel (Taxotere®), cisplatin, and 5-FU
- Cisplatin with capecitabine (Xeloda®)

Other chemo drugs that have been used to treat cancer of the esophagus include carboplatin, oxaliplatin, doxorubicin (Adriamycin®), bleomycin, mitomycin, methotrexate, paclitaxel (Taxol®), vinorelbine (Navelbine®), topotecan, and irinotecan (Camptosar®).

For some esophagus cancers, chemotherapy may be used along with the targeted drug trastuzumab (Herceptin®). For more information on this drug, see "Targeted therapy for esophagus cancer."

Possible 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 are also likely to be affected by chemo, which can lead to side

effects. Side effects depend on the specific drugs used, their dose, and the length of treatment. Common side effects of chemo include:

- Nausea and vomiting
- Loss of appetite
- Hair loss
- Mouth sores
- Diarrhea
- An increased chance of infection (because of a shortage of white blood cells)
- Problems with bleeding or bruising (due to a shortage of blood platelets)
- Fatigue or shortness of breath (due to low red blood cell counts)

Along with the risks above, some chemotherapy drugs can cause other, less common side effects. For example, cisplatin can cause nerve and kidney damage. Doxorubicin and epirubicin both can cause heart damage if enough of the drug is given.

Most side effects improve once treatment is stopped, but some can last a long time or even be permanent. If your doctor plans treatment with chemo you should be sure to discuss the drugs that will be used and the possible side effects. Let your health care team know if you have side effects, so they can be treated. There are ways to prevent and treat many of the side effects of chemotherapy. For example, many good drugs are available to help prevent or treat nausea and vomiting.

People with esophageal cancer have often already lost weight before the cancer was found. Treatment such as chemo, radiation, and chemoradiation can cause painful sores in the mouth and throat. These can make it hard to eat well enough to get good nutrition, making weight loss worse. Some people with esophageal cancer may need to have a feeding tube, usually called a jejunostomy tube (or J-tube), put in place before treatment. 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 prevent further weight loss and improve nutrition. This can make treatment easier to tolerate. Feeding tubes can easily be removed when they are no longer needed.

Targeted therapy for esophagus cancer

As researchers have learned more about the changes in cells that cause cancer, they have been able to develop newer drugs that specifically target these changes. Targeted drugs work differently from standard chemotherapy drugs. They often have different (and less severe) side effects.

A small number of esophagus cancers have too much of a protein called HER2 on the surface of their cells. This protein may help the cancer cells to grow.

A drug that targets the HER2 protein, known as trastuzumab (Herceptin), may help treat these cancers when used along with chemotherapy. If you have esophageal cancer and cannot have surgery, your doctor may have your tumor biopsy samples tested for the HER2 protein. Only cancers that have too much of the HER2 protein are likely to be affected by this drug.

Trastuzumab is given by injection into a vein (IV) once every 3 weeks along with chemo. The optimal length of time to give it is not yet known.

The side effects of trastuzumab are relatively mild and may include fever and chills, weakness, nausea, vomiting, cough, diarrhea, and headache. These occur less often after the first dose. This drug is not given with certain chemo drugs called anthracyclines, such as epirubicin (Ellence) or doxorubicin (Adriamycin), because it may further increase the risk of heart damage if they are given together.

Endoscopic treatments for esophagus cancer

Several types of treatment for esophageal cancer can be done by passing an endoscope (a long, flexible tube) down the throat and into the esophagus. Some of these treatments may be used to try to cure very early stage cancers, or even to prevent them from developing by treating Barrett's esophagus or dysplasia. Other treatments are used mainly to help relieve symptoms from more advanced esophageal cancers that can't be removed.

Endoscopic mucosal resection

Endoscopic mucosal resection (EMR) is a technique where the inner lining of the esophagus is removed with instruments attached to the endoscope. EMR can be used for dysplasia (pre-cancer) and some very early focal (single, small tumors) cancers of the esophagus.

After the abnormal tissue is removed, patients take drugs called proton pump inhibitors to suppress acid production in the stomach. This can help keep the disease from returning.

Photodynamic therapy

Photodynamic therapy (PDT) is a method that can be used to treat esophageal pre-cancer (dysplasia) and some early esophageal cancers. These may be found when Barrett's esophagus is biopsied. PDT can also be used to help with symptoms for some cancers that are too advanced to be removed.

For this technique, a light-activated drug called porfimer sodium (Photofrin) is injected into a vein. Over the next couple of days, the drug is more likely to collect in cancer cells than in normal cells. A special type of laser light is then focused on the cancer through an endoscope. This light causes changes in the drug that has collected inside the cancer cells, changing it into a new chemical that can kill cancer cells. The dead cells may then be removed a few days later during an upper endoscopy. This process can be repeated if needed.

The advantage of PDT is that it can kill cancer cells with very little harm to normal cells. But because the chemical must be activated by light, it can only kill cancer cells near the inner surface of the esophagus – those that can be reached by the light. This light cannot reach cancers that have spread deeper into the esophagus or to other organs.

PDT may cause swelling in the esophagus for a few days, which may lead to some problems swallowing. Strictures (areas of extreme narrowing) can also occur in some patients. These often need to be treated by with dilation. Other possible side effects include bleeding or holes in the esophagus.

Some of this drug also collects in normal cells in the body, such as skin and eye cells. This can make you very sensitive to sunlight or strong indoor lights. Too much exposure can cause serious skin reactions, which is why doctors recommend staying out of any strong light for 4 to 6 weeks after the injection.

This treatment can cure some very early esophageal cancers that have not spread to deeper tissues. But this procedure destroys the tissue, so it can be hard to be certain that the cancer has not spread into deeper layers of the esophagus. Since the light used in PDT may only reach those cancer cells near the surface of the esophagus, cells of deeper cancers could be left behind, and grow into a new tumor. People getting this treatment need to have follow-up endoscopies to make sure the cancer hasn't grown back. They also need to stay on a drug called a proton pump inhibitor to stop stomach acid production.

PDT is being used to treat Barrett's esophagus and very early esophageal cancers found in Barrett's esophagus. When PDT is used to treat dysplasia (pre-cancer) in Barrett's esophagus, it cuts the chance of a cancer developing by about half.

PDT is also often used to treat large cancers that are blocking the esophagus. In this situation, PDT is not meant to destroy all of the cancer, but to kill enough of the cancer to improve the patient's ability to swallow.

For more information, please see our document, *Photodynamic Therapy*.

Radiofrequency ablation (RFA)

This procedure can be used to treat dysplasia in areas of Barrett's esophagus. It may lower the chance of cancer developing in that area.

In this procedure, a balloon containing many small electrodes is passed into an area of Barrett's esophagus through an endoscope. The balloon is then inflated so that the electrodes are in contact with the inner lining of the esophagus. Then an electrical current is passed through it, which kills the cells in the lining by heating them.

Over time, normal cells will grow in to replace the Barrett's cells. The patient needs to stay on drugs to block stomach acid production after the procedure. Endoscopy (with biopsies) then is done periodically to watch for any further changes in the lining of the esophagus. RFA rarely causes strictures (narrowing) or bleeding in the esophagus.

Laser ablation

This technique can be used to help open up the esophagus when it is blocked by an advanced cancer. This can help improve problems swallowing.

In this treatment, a laser beam is aimed at the cancer through the tip of an endoscope. The laser opens up the esophagus by vaporizing and coagulating cancerous tissue. The laser used is called a *neodymium: yttrium-aluminum-garnet (Nd:YAG) laser*. Most patients will benefit from laser endoscopy, but the cancer often grows back, so the procedure may need to be repeated every month or two.

Argon plasma coagulation

This technique is similar to laser ablation, but it uses argon gas and a high-voltage spark delivered through the tip of an endoscope. The spark causes the gas to reach very high temperatures, which can then be aimed at the tumor. This approach is used to help unblock the esophagus when the patient has trouble swallowing.

Electrocoagulation (electrofulguration)

This method involves passing a probe down into the esophagus through an endoscope and then burning the tumor off with electric current. In some cases, this treatment can help relieve esophageal blockage.

Esophageal stent

A stent is a device made of mesh material. Most often stents are made out of metal, but they can also be made out of plastic. Using endoscopy, a stent can be placed into the esophagus across the length of the tumor. Once in place, it self-expands (opens up) to become a tube that helps hold the esophagus open.

The success of the stent depends on the type of stent that is used and where it is placed. Stents will relieve trouble swallowing in most patients that are treated. They are often used after other treatments to help keep the esophagus open.

Clinical trials for esophagus 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 Web site 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 Web site at www.cancer.gov/clinicaltrials.

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

Clinical trials are one way to get state-of-the art cancer treatment. They are 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*. You can read it on our Web site or call our toll-free number (1-800-227-2345) and have it sent to you.

Complementary and alternative therapies for esophagus 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 Web sites may 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 to 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 might 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 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.

Treating esophagus cancer by stage

Most of the time, the initial treatment of esophagus cancer is based on its stage – how far it has spread in the body. But other factors, such as a person's overall health, may also affect treatment options. Talk to your doctor if you have any questions about the treatment plan he or she recommends.

Stage 0

A stage 0 tumor is not true cancer. It contains abnormal cells called *high-grade dysplasia* and is really a type of pre-cancer. The abnormal cells look like cancer cells, but they are only found in the inner layer of cells lining of the esophagus (the epithelium). They have not grown into deeper layers of the esophagus. This stage is often diagnosed when a routine biopsy is done in someone with Barrett's esophagus.

Options for treatment may include endoscopic treatments such as photodynamic therapy, radiofrequency ablation, or endoscopic mucosal resection (EMR). Still, many doctors feel that surgery to remove the esophagus remains the standard treatment.

Stage I

In this stage the cancer has grown into some of the deeper layers of the esophagus (past the innermost layer of cells) but has not reached the lymph nodes or other organs.

Some very early stage I cancers that involve only a small area of the mucosa and haven't grown into the submucosa may be treated with EMR. This may be followed by some type of endoscopic procedure to destroy any remaining abnormal areas in the esophagus lining.

But most patients who are healthy enough have surgery (esophagectomy) to remove the part of their esophagus that contains the cancer. Some doctors may recommend treatment with chemotherapy and radiation therapy (chemoradiation) after surgery, especially if there are signs that all of the cancer may not have been removed.

If the cancer is in the upper part of the esophagus (in the neck), chemoradiation may be recommended as the main treatment instead of surgery. This may cure the cancer in some patients. Close follow-up with endoscopy is very important to look for possible signs of cancer returning.

Patients who cannot have surgery because they have other serious health problems may be treated with chemotherapy, radiation therapy, or both together.

Stage II

Stage II includes cancers that have grown into the main muscle layer of the esophagus or through the muscle layer and into the connective tissue on the outside of the esophagus. This stage also includes some cancers that have spread to 1 or 2 nearby lymph nodes.

For people who are healthy enough, treatment options for this stage include surgery, chemotherapy followed by surgery, or chemoradiation followed by surgery. Patients with adenocarcinoma at the place where the stomach and esophagus meet (the gastroesophageal junction) are often treated with chemotherapy (possibly including the targeted drug Herceptin) followed by surgery.

If surgery is the initial treatment, chemoradiation may be recommended afterward, especially if the cancer is an adenocarcinoma or if there are signs that some cancer may have been left behind.

In some instances (especially for cancers in the upper part of the esophagus), chemoradiation may be recommended as the main treatment instead of surgery. Patients who do not have surgery need close follow-up with endoscopy to look for possible signs of remaining cancer. Unfortunately, even when cancer cannot be seen, it can still be present below the inner lining of the esophagus, so close follow-up is very important.

Patients who cannot have surgery because they have other serious health problems are usually treated with chemotherapy and radiation therapy.

Stage III

Stage III includes some cancers that have grown through the wall of the esophagus to the outer layer, as well as cancers that have grown into nearby organs or tissues. It also includes most cancers that have spread to nearby lymph nodes.

These cancers are treated much like stage II cancers.

For people who are healthy enough, treatment options for this stage may include surgery, chemotherapy followed by surgery, or chemoradiation followed by surgery. Patients with adenocarcinoma at the place where the stomach and esophagus meet (the gastroesophageal junction) are often treated with chemotherapy (possibly including the targeted drug Herceptin) followed by surgery.

If surgery is the initial treatment, chemoradiation may be recommended afterward, especially if the cancer is an adenocarcinoma or if there are signs that some cancer may have been left behind.

In some instances (especially for cancers in the upper part of the esophagus), chemoradiation may be recommended as the main treatment instead of surgery. Patients who do not have surgery need close follow-up with endoscopy to look for possible signs of remaining cancer. Unfortunately, even when cancer cannot be seen, it can still be present below the inner lining of the esophagus, so close follow-up is very important.

Patients who cannot have surgery because they have other serious health problems are usually treated with chemotherapy and radiation therapy.

Stage IV

Stage IV esophageal cancer has spread to distant lymph nodes or to other distant organs.

In general, these cancers are very hard to get rid of completely, so surgery to try to cure the cancer is usually not a good option. Treatment is used mainly to help keep the cancer under control for as long as possible and to relieve any symptoms it is causing.

Chemotherapy may be given to try to help patients feel better and live longer, but the benefit of giving chemo is not clear. Radiation therapy or other treatments may be used to help with pain or trouble swallowing. Some people prefer not to have treatments that have serious side effects and choose to receive only those treatments that will keep them comfortable and add to their quality of life. For more information on treatments that may be helpful, see the section, "Palliative therapy for esophagus cancer."

Recurrent esophagus cancer

When a cancer comes back after treatment, it is called *recurrent* or *relapsed* cancer. Cancer that comes back in or near where it started is called a *local* recurrence. If it comes back in distant organs or tissues (such as the liver), it is called a *distant* recurrence. Treatment of recurrent esophageal cancer depends on where it comes back, as well as how it was treated the first time.

If the cancer was initially treated endoscopically (with endoscopic mucosal resection or photodynamic therapy), it most often comes back in the esophagus. This type of recurrence is often treated by removing the esophagus. If the patient isn't healthy enough for surgery, the cancer may be treated with chemotherapy, radiation, or both.

If cancer recurs locally after surgery (such as in nearby lymph nodes), radiation and/or chemotherapy may be used. Radiation may not be an option if it was already given as part of the initial treatment. When chemotherapy was given before, it is usually still possible to give more chemotherapy. Sometimes the same drugs that were used before are given again, but often other drugs are used.

Esophageal cancer that recurs in distant parts of the body is treated like a stage IV cancer (see "Treating esophagus cancer by stage" for more details). Palliative treatments (see next section) are used as needed.

Palliative therapy for esophagus cancer

Palliative therapy is treatment aimed at relieving symptoms. It is not meant as a cure for the cancer.

Several types of treatment can be used to help prevent or relieve symptoms from esophageal cancer. In some cases, they are given along with other treatments that are intended to cure the cancer. In other cases, palliative treatments are given when a cure is not possible. The main purpose of this type of treatment is to improve the patient's comfort and quality of life.

Esophageal dilation

In this procedure, a small balloon-like device or a device shaped like a cylinder is passed down the throat and pushed through an area of the esophagus that is narrowed or blocked. The goal is to stretch out the area and allow better swallowing. This procedure can be repeated if needed. Before the procedure, your doctor may give you a sedative to help you relax and may numb your throat by spraying it with a local anesthetic.

There is a small risk of bleeding or tearing a hole in the esophagus (called perforation) with this procedure, which could require surgery or other treatments to fix. The esophagus typically stays open only about 2 weeks after dilation, so it is often followed by other treatments to help keep the esophagus open.

Endoscopic procedures

Several types of endoscopic procedures can be used to help keep the esophagus open in people who are having trouble swallowing. These techniques are described in more detail in the section, "Endoscopic treatments for esophagus cancer." Procedures that may be used include:

- Esophageal stent placement

- Photodynamic therapy
- Electrocoagulation
- Laser ablation
- Argon plasma coagulation

Radiation therapy

External-beam radiation can often help relieve some of the symptoms from advanced esophageal cancer, including pain and problems swallowing. Radiation is often used for cancer that has spread to the brain or spine, but it is also useful in treating problems with swallowing from a narrowed or blocked esophagus.

If an area had been treated with external beam radiation therapy earlier, it may not be able to be treated that way again. In that case, brachytherapy may be an option. Brachytherapy is especially useful in helping to relieve a blocked esophagus. (See "Radiation therapy for esophagus cancer" for more details.)

Pain management

Pain control is an important concern for people with cancer. There are many ways to treat cancer pain. People with cancer should let their cancer care team know immediately if they are in pain. The cancer care team can provide medicines and other palliative treatments to relieve pain and other symptoms.

Nutritional support

Nutrition is another concern for many patients with esophagus cancer. A team of doctors and nutritionists can work with you to provide nutritional supplements and information about your individual nutritional needs.

Some people having trouble swallowing may need to have a feeding tube, usually called a jejunostomy tube (or J-tube), put into the first part of 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 stomach instead. This is known as a gastrostomy tube or G-tube.

More treatment information

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 NCI provides treatment information via telephone (1-800-4-CANCER) and its Web site (www.cancer.gov). Information for patients as well as more detailed information intended for use by cancer care professionals is also available on www.cancer.gov.

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. These are available on the NCCN Web site (www.nccn.org).

What should you ask your doctor about cancer of the esophagus?

It is important to have honest, open discussions with your cancer care team. It is important for you to have honest, open discussions with your cancer care team. They want to answer all of your questions, no matter how minor they might seem. For instance, consider these questions:

- What kind of esophageal cancer do I have?
- Has my cancer spread beyond the primary site?
- 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?
- Are there other doctors I need to see?
- How much experience do you have treating this type of cancer?
- What treatment choices do I have?
- What treatment(s) do you recommend and why?
- What is the goal of the treatment?
- What are the chances my cancer can be cured with these options?
- What are the risks or side effects that I should expect? How long are they likely to last?
- How quickly do we need to decide on treatment?
- What should I do to be ready for treatment?
- Will I have special nutritional needs due to the esophageal cancer?
- How long will treatment last? What will it involve? Where will it be done?
- What would we do if the treatment doesn't work or if the cancer recurs?
- What type of follow-up will I need after treatment?

- 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 so you can plan your work or activity schedule. You may also want to ask about second opinions or about clinical trials for which you may qualify.

Keep in mind that doctors are not the only ones who can provide you with information. Other health care professionals, such as nurses and social workers, may have the answers you seek.

What happens after treatment for cancer of the esophagus?

For some people with esophagus 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 growing or coming back. (When cancer comes back after treatment, it is called *recurrence*.) This is a very common concern in people 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 living full lives. Our document, *Living With Uncertainty: The Fear of Cancer Recurrence*, gives more detailed information on this.

For other people, the esophagus cancer may never go away completely. These people may get regular treatments with chemotherapy, radiation therapy, or other therapies to help keep the cancer in check. Learning to live with cancer as a more of a chronic disease can be difficult and very stressful. It has its own type of uncertainty.

Follow-up care

If you have completed treatment, your doctors will still want to watch you closely. It is very important to keep all follow-up appointments. During these visits, your doctors will ask about symptoms, examine you, and may order blood tests, upper endoscopy, or imaging tests such as upper gastrointestinal (GI) x-rays, barium swallows, or CT scans. These tests are described in the section, "How is esophagus cancer diagnosed?" Follow-up is needed to check for cancer recurrence or spread, as well as for possible side effects of certain treatments. This is the time for you to ask your health care team any questions you need answered and to discuss any concerns you might have.

Almost any cancer treatment can have side effects. Some may last for a few weeks to several months, but others can last the rest of your life. Don't hesitate to tell your cancer care team about any symptoms or side effects that bother you so they can help you manage them.

It is very important to report any new symptoms to the doctor right away, especially if they include trouble swallowing or chest pain. Early treatment can relieve many symptoms and improve your quality of life.

If cancer does recur, treatment will depend on the location of the cancer and what treatments you've had before. For more information on how recurrent cancer is treated, see the section, "Recurrent esophagus cancer." For more general information on dealing with a recurrence, you may also want to see our document, *When Your Cancer Comes Back: Cancer Recurrence*. You can get this document by calling 1-800-227-2345.

Help for trouble swallowing, nutrition, and pain

Palliative treatments are aimed at helping to relieve the symptoms of esophagus cancer, rather than trying to cure the cancer. In some cases they are used along with other treatments that focus on curing the cancer, but palliative treatments are often used in people with advanced cancer to help improve their quality of life.

Cancer of the esophagus often causes trouble swallowing. This is why weight loss and weakness due to poor nutrition are common problems. A team of doctors and nutritionists can work with you to provide nutritional supplements and information about your individual nutritional needs. This can be valuable in helping you maintain your weight and nutritional intake.

There are many ways to control pain caused by cancer of the esophagus. If you have pain, please tell your cancer care team right away, so they can give you prompt and effective pain management.

For more information on palliative treatments, see the section, "Palliative therapy for esophagus cancer."

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. Make sure you have this information handy:

- A copy of your pathology report(s) from any biopsies or surgeries
- Copies of imaging tests (CT or MRI scans, etc.), which can usually be stored on a CD, DVD, etc.
- If you had surgery, a copy of your operative report(s)
- If you were in the hospital, a copy of the discharge summary that doctors prepare when patients are sent home
- If you had radiation therapy, a summary of the type and dose of radiation and when and where it was given

- If you had chemotherapy, a list of the drugs, drug doses, and when you took them

It is also important to keep health insurance. Tests and doctor visits cost a lot, and even though no one wants to think of their cancer coming back, this could happen.

Lifestyle changes

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 the 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.

You can 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. Treatment may change your sense of taste. Nausea can be a problem. You may not feel like eating and lose weight when you don't want to. Or you may have gained weight that you can't seem to lose. All of these things can be very frustrating.

If treatment caused weight changes or eating or taste problems, do the best you can and keep in mind that these problems usually get better over time. You may find it helps to eat small portions every 2 to 3 hours until you feel better. You may also want to ask your cancer team about seeing a dietitian, an expert in nutrition who can give you ideas on how to deal with these treatment side effects.

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 own 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 esophagus cancer to say for sure if there are things you can do that will be helpful. Tobacco and alcohol use have clearly been linked to esophagus cancer, so not smoking or drinking may 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 your American Cancer Society at 1-800-227-2345.

Adopting other healthy behaviors such as eating well, getting regular physical activity, and maintaining a healthy weight may help as well, but no one knows for sure. However, we do know that these types of changes can have positive effects on your health that can extend beyond your risk of cancer.

How about 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 relationships with those around you. Unexpected issues may also cause concern. For instance, you may 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 who 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.

If treatment is no longer working

If cancer keeps growing or comes back after one kind of treatment, it may be possible to try another treatment plan that might still cure the cancer, or at least shrink the tumors 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, including treatment side effects. 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, it is important that you 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 purpose 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 drugs 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 bone pain caused by cancer that has spread to the bones. 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.

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 called *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 esophagus cancer research and treatment?

Research into the causes, prevention, and treatment of esophageal cancer is now being done at many medical centers, university hospitals, and other institutions across the nation.

Genetics

Researchers have found many of the changes in certain genes that appear to be responsible for causing normal cells of the esophagus to develop into esophageal cancer. Further progress may lead to new tests for finding esophageal cancer at an earlier, more curable stage. Understanding these changes may also lead to new targeted therapies that overcome the effects of these abnormal genes.

Screening and prevention

The rate of adenocarcinoma of the esophagus has risen sharply in recent decades. Efforts are now being made to reduce obesity, a major risk factor for this form of cancer (and several other types as well).

In people with Barrett's esophagus, researchers are trying to determine if newer tests can tell which patients are likely to go on to develop cancer. This may help doctors determine which patients need intense follow-up and which ones may be examined less frequently.

Researchers are also looking for ways to help stop Barrett's cells from turning into pre-cancer or cancer. Drugs such as proton pump inhibitors and aspirin are now being studied for this purpose.

Drug treatment

Many studies are testing new ways to combine drugs already known to be active against esophageal cancer to try to improve their effectiveness. Other studies are testing the best ways to combine chemotherapy with radiation therapy.

Targeted drugs, which attack certain substances in cancer cells, have been successful in some other cancers and are now being tested in esophageal cancer. For example, the drug trastuzumab (Herceptin) interferes with a protein on esophageal cancer cells called HER2, which helps them grow and spread. Only a small portion of esophagus cancers (mostly adenocarcinomas) have too much of this protein, but this drug may help treat these cancers.

Other targeted drugs are now being studied for use against esophagus cancer as well.

Additional resources for esophagus cancer

More information from your American Cancer Society

We have some related information that may also be helpful to you. These materials may be viewed on our Web site or ordered from our toll-free number (1-800-227-2345).

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

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

Clinical Trials: What You Need to Know

Living with Uncertainty: The Fear of Cancer Recurrence

Pain Control: A Guide for Those With Cancer and Their Loved Ones (also available in Spanish)

Photodynamic therapy

Questions About Smoking, Tobacco, and Health (also available in Spanish)

Surgery (also available in Spanish)

Understanding Chemotherapy: A Guide for Patients and Families (also available in Spanish)

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

When Your Cancer Comes Back: Cancer Recurrence

The following books are available from The American Cancer Society. Call us at 1-800-227-2345 to ask about costs or to place your order.

American Cancer Society Complete Guide to Complementary & Alternative Cancer Therapies

American Cancer Society Complete Guide to Family Caregiving, Second Edition

American Cancer Society Complete Guide to Nutrition for Cancer Survivors

American Cancer Society's Guide to Pain Control, Second Edition

Cancer in the Family: Helping Children Cope with a Parent's Illness

What Helped Me Get Through: Cancer Patients Share Wisdom and Hope

What to Eat During Cancer Treatment

When the Focus Is on Care: Palliative Care and Cancer

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: 1-800-4-CANCER (1-800-422-6237)
TYY: 1-800-332-8615
Web site: www.cancer.gov

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

**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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