



ESOPHAGUS CANCER

What is cancer?

Cancer develops when cells in a part of the body begin to grow out of control. Although there are many kinds of cancer, they all start because of out-of-control growth of abnormal cells.

Normal body cells grow, divide, and die in an orderly fashion. During the early years of a person's life, normal cells divide more rapidly until the person becomes an adult. After that, cells in most parts of the body divide only to replace worn-out or dying cells and to repair injuries.

Because cancer cells continue to grow and divide, they are different from normal cells. Instead of dying, they outlive normal cells and continue to form new abnormal cells.

Cancer cells develop because of damage to DNA. This substance is in every cell and directs all its activities. Most of the time when DNA becomes damaged the body is able to repair it. In cancer cells, the damaged DNA is not repaired. People can inherit damaged DNA, which accounts for inherited cancers. Many times though, a person's DNA becomes damaged by exposure to something in the environment, like smoking.

Cancer usually forms as a tumor. Some cancers, like leukemia, do not form tumors. Instead, these cancer cells involve the blood and blood-forming organs and circulate through other tissues where they grow.

Often, cancer cells travel to other parts of the body, where they begin to grow and replace normal tissue. This process is called metastasis. Regardless of where a cancer may spread, however, it is always named for the place it began. For instance, breast cancer that spreads to the liver is still called breast cancer, not liver cancer.

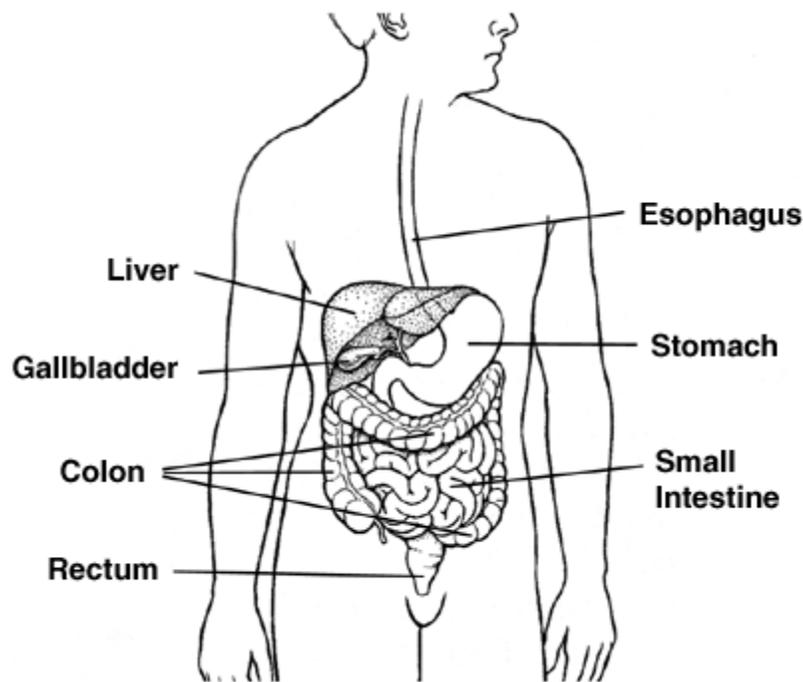
Not all tumors are cancerous. Benign (non-cancerous) tumors do not spread (metastasize) to other parts of the body and, with very rare exceptions, are not life threatening.

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.

Cancer is the second leading cause of death in the United States. Nearly half of all men and a little over one third of all women in the United States will develop cancer during their lifetimes. Today, millions of people are living with cancer or have had cancer. The risk of developing most types of cancer can be reduced by changes in a person's lifestyle, for example, by quitting smoking and eating a better diet. The sooner a cancer is found and treatment begins, the better are the chances for living for many years.

What Is Cancer of the Esophagus?

The esophagus is a muscular tube that carries food and liquid from the mouth to the stomach. The esophagus is usually between 10 and 13 inches long. The normal adult esophagus is roughly three fourths of an inch across at its smallest point.



The wall of the esophagus has several layers. Cancer of the esophagus -- also referred to as esophageal cancer -- starts from its inner layer and grows outward. The layer that lines the inside of the esophagus is called the mucosa. The mucosa has 2 parts: the epithelium and the lamina propria. The epithelium forms the lining of the esophagus and is made up of flat, thin

cells called squamous cells. The lamina propria is a thin layer of connective tissue right under the epithelium.

The next layer is the submucosa. Some parts of the esophagus have mucus-secreting glands in this layer. The layer under the submucosa is a thick band of muscle called the muscularis propria. This layer of muscle contracts in a coordinated, rhythmic way to force food along the esophagus from the throat to the stomach. The outermost layer of the esophagus is formed by connective tissue. It is called the adventitia.

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 junction, or GE junction. There is a special area of muscle near the GE junction called the lower esophageal sphincter. 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.

The stomach has strong acid and enzymes that digest food. The epithelium or lining of the stomach is made of glandular 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 can escape from the stomach into the esophagus. The medical term for the escape of acid from the stomach back into the esophagus is *reflux* or *gastroesophageal reflux disease (GERD)*. In many cases, reflux can cause symptoms such as heartburn or a burning sensation radiating from the middle of the chest. However, in some cases, reflux can occur without any symptoms at all. If the reflux of stomach acid into the lower esophagus continues for a long time, the acid can cause injury to the lining of the esophagus, with abnormal glandular cells replacing the squamous cells that usually line the esophagus. These glandular cells usually look like the cells that line the stomach and are more resistant to stomach acid. When these glandular cells are noted in a person's esophagus, he or she has a condition called *Barrett esophagus*. People with Barrett esophagus are at a highly increased risk for developing cancer of the esophagus (estimated at 30-100 x normal), and therefore need to be followed closely by their doctor. Even though they are at greater than average risk, most people with Barrett esophagus still do not go on to develop cancer of the esophagus.

There are 2 main types of esophageal cancer: *squamous cell carcinoma* and *adenocarcinoma*. Since the entire esophagus is normally lined with squamous cells, squamous cell carcinoma can occur anywhere along the length of the esophagus. At one time, squamous cell carcinoma was by far the more common of the 2 cancer types in the United States and was responsible for almost 90% of all esophageal cancers. Recently, this has changed. Now, squamous cell cancers make up less than 50% of esophageal cancers. .

Adenocarcinomas start in glandular tissue, which normally does not cover the esophagus. Before an adenocarcinoma can develop, glandular cells must replace an area of squamous

cells, as in the case of Barrett esophagus. This occurs mainly in the lower esophagus, which is the site of most adenocarcinomas.

What Are the Key Statistics About Cancer of the Esophagus?

The American Cancer Society estimates that during 2008 approximately 16,470 new esophageal cancer cases will be diagnosed in the United States. This disease is 3 to 4 times more common among men than among women and about 50% more common among African Americans than among whites. 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 in these countries is squamous cell carcinoma.

In Western countries, the rate of adenocarcinoma of the esophagus in white men has been increasing at about 2% a year. The esophageal cancer rate has been unchanged in white women. The rate of esophageal cancer, mainly squamous cell, has been dropping in African American men and women.

The American Cancer Society estimates during 2008, 14,280 deaths from esophageal cancer will occur. Because esophageal cancer is usually diagnosed at a late stage, many people with esophageal cancer eventually die of this disease. However, survival rates have been improving. During the early 1960s, only 4% of all white patients and 1% of all African-American patients survived at least 5 years after diagnosis. Now, 18% of white patients and 11% of African-American patients survive at least 5 years after diagnosis. These figures refer to patients with all stages of disease, so survival rates in earlier stage disease will be higher.

These survival rates are called *relative* survival rates. The 5-year survival rate refers to the percent of patients who live at least 5 years after their cancer is diagnosed. This includes people who die of other causes. Five-year relative survival rate assumes that some people will die of other causes and compares the observed survival with that expected for people without the cancer. That means that relative survival only talks about deaths from the cancer in question. This is a more accurate way to describe the prognosis for patients with a particular type and stage of cancer. Five-year rates are used to produce a standard way to discuss prognosis, or outlook for survival.

What Are the Risk Factors for Cancer of the Esophagus?

A *risk factor* is anything that increases your chance of getting a disease such as cancer. Different cancers have different risk factors. For example, unprotected exposure to strong sunlight is a risk factor for skin cancer, and smoking is a risk factor for lung, colon, and many other cancers. Scientists have found several risk factors that make you more likely to develop 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.

Age: The incidence of esophageal cancer, or rate or frequency of occurrence, increases with age. Nearly half of all people with this cancer are older than age 70. Around three fourths of people diagnosed are between ages 55 and 85. For people younger than age 40, the chance of developing this cancer is less than 1 in 100,000.

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

Race: African Americans are 50% more likely to develop esophageal cancer than whites. Most esophageal cancers in African Americans are the squamous cell type. In contrast, adenocarcinomas are the most common form of esophageal cancer in whites.

Barrett esophagus: This condition, which affects the lining of the lower esophagus is often associated with long-term reflux of stomach and duodenal fluids into the lower esophagus. One estimate from a Swedish study estimates that about 1.6% of their population over age 18 had Barrett esophagus. This would mean about 3 million people in the United States. Only about 56% of these people with Barrett esophagus had symptoms of "heartburn," while the others had no symptoms at all. Barrett esophagus is a risk factor for the adenocarcinoma type of cancer of the esophagus. This is because the abnormal cells in Barrett esophagus can progress over time to become dysplasia, a pre-cancerous condition. Dysplasia is characterized by degrees, or grades, with high-grade dysplasia being the most abnormal. People with Barrett esophagus are anywhere from 30 to 125 times more likely than people without this condition to develop esophageal cancer. Although the exact risk of developing cancer in people with Barrett esophagus is not known, researchers estimate it to be only 1 in 200 per year.

Gastroesophageal reflux disease (GERD): Whether or not Barrett esophagus has been diagnosed, long-standing gastroesophageal reflux disease, also called GERD, increases the risk of adenocarcinoma of the esophagus. Heartburn is one of the main symptoms of GERD, although GERD can occur without symptoms. A recent Gallup poll found that 44% of adults in the United States have heartburn at least once per month. About 30% of esophageal cancer cases can be linked to GERD.

Tobacco: The use of tobacco products, including cigarettes, cigars, pipes, and chewing tobacco, is a major risk factor for esophageal cancer. The longer a person uses tobacco, the higher the cancer risk. The risk for the adenocarcinoma type of esophageal cancer is doubled in smokers of a pack or more a day. More than half of all squamous cell type of esophageal cancer is linked to smoking.

Alcohol: Long-term heavy drinking of alcohol is an important risk factor for esophageal cancer, mainly the squamous cell type. Although alcohol is probably not as strong a risk factor as smoking, the combination of smoking and drinking alcohol raises a person's risk much more than using either alone.

Obesity: Overweight and obesity are clearly risk factors, particularly for adenocarcinoma of the esophagus. The risk of dying from this cancer is increased by around 50% in obese men.

Diet: Diets low in fruits and vegetables, as well as certain minerals and vitamins, particularly vitamins A, C, and riboflavin may increase the risk for esophageal cancer. Overeating, which leads to obesity, increases the risk of the adenocarcinoma type of esophageal cancer. Certain substances in the diet may increase the cancer risk and may explain the high rate of this cancer in certain parts of the world. About 15% of esophageal cancer can be linked to a diet poor in fruits and vegetables. There have been suggestions, as yet unproven, that a diet high in processed meat may also increase the chance of developing esophageal cancer.

Very hot liquids: Frequent drinking of very hot liquids may increase the risk for the squamous cell type of esophageal cancer.

Occupational exposures: Exposure to the solvents used for dry cleaning may lead to a greater risk of esophageal cancer. Dry cleaning workers have a higher rate of esophageal cancer. Exposure to other chemical fumes also may lead to an increased risk of esophageal cancer.

Lye ingestion: 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. Children who find and accidentally swallow household chemicals have a high rate of the squamous cell type of esophageal cancer as adults. The cancers occur on average about 40 years after the lye was swallowed.

Achalasia: In this disease, the lower esophageal sphincter does not relax properly to allow food/liquid to pass into the stomach. The cause of this disease is probably a defect of nerve cells in the lower esophagus that keeps the lower esophageal sphincter from relaxing and thus makes it difficult to swallow. The esophagus above this narrowing becomes dilated (larger) and retains food. The reason that achalasia is a risk factor for esophageal cancer is not clear, but roughly 6% of all achalasia patients develop squamous cell-type esophageal cancer.

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. A mutation of a gene on chromosome 17 is thought to be responsible for tylosis as well as some esophageal cancers. People with this condition have a very high risk (about 40%) for squamous cell type of esophageal cancer and therefore require early and regular monitoring with an upper endoscopy (scope with camera placed to view the esophagus).

Esophageal webs: These abnormal protrusions of tissue into the esophagus can interfere with swallowing. This abnormality is sometimes present in people who also have anemia and abnormalities of the tongue, fingernails, spleen, and other organs. This combination of abnormalities is usually called the Plummer-Vinson syndrome but is sometimes also referred to as Paterson-Kelly syndrome. About 1 in 10 patients with this syndrome eventually develop squamous cell cancer of the esophagus.

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 use of tobacco or alcohol abuse, cause esophageal cancer by damaging the DNA of cells that line the inside of the esophagus. The DNA of esophageal cancer cells often shows many abnormalities; however, there have been no special changes described that are typical of this cancer. Long-term irritation of the lining of the esophagus -- as with GERD, Barrett esophagus, achalasia, esophageal webs, or scarring from swallowing lye -- can promote formation of cancers.

Can Cancer of the Esophagus Be Prevented?

The risk of developing this disease can be greatly reduced by avoiding certain risk factors.

Some risk factors such as age, sex, and race cannot be changed. Other lifestyle risk factors can be changed to reduce the risk of cancer. In the United States, the most important lifestyle risk factors for cancer of the esophagus are tobacco use and alcohol abuse. The risk of esophageal cancer increases by 18 times in people who drink more than about 13 ounces of alcohol a day for years. If this same person smokes at least 1 to 2 packs of cigarettes a day, the risk of esophageal cancer increases 44 times. Avoiding these 2 factors is the best way to reduce the risk of esophageal cancer.

Diet and exercise are also important. A diet rich in fruits and vegetables, especially if eaten raw, is thought to help protect against esophageal cancer. Also, since obesity has been associated with esophageal cancer, particularly the adenocarcinoma type, physical activity and maintaining a healthy weight can reduce the risk of this disease.

Some studies have found that the risk of cancer of the esophagus is reduced in people who take aspirin or other nonsteroidal anti-inflammatory drugs, also called NSAIDs, such as ibuprofen. However, regular NSAID use can also cause certain complications, such as gastrointestinal bleeding, in some people. For this reason, regular NSAID use should be discussed carefully with your doctor, to determine the potential benefits and risks of NSAID use in your case.

In addition, persons at increased risk for esophageal cancer, such as those with Barrett esophagus, may undergo surveillance testing to monitor whether the abnormal cells progress any further. If a pre-cancerous condition called dysplasia is detected, the doctor may make suggestions in an effort to prevent further progression to esophageal cancer.

A preliminary report found that people with Barrett esophagus were less likely to develop early cancer-like changes if they were taking drugs called proton pump inhibitors. These drugs are often used to reduce stomach acid in people with GERD. It is important for people with heartburn or GERD to speak with their doctor to determine whether a proton pump inhibitor or other type of medication is appropriate for them.

Can Cancer of the Esophagus Be Found Early?

There are no early detection tests used in the United States to screen the general population for esophageal cancer. However, people who have chronic GERD often undergo testing by upper endoscopy to identify or monitor the development of esophageal injury, called esophagitis. In addition, people who are at high risk for esophageal cancer, such as those with Barrett esophagus, are followed closely to ensure that any further abnormal changes are found early.

Testing for People at High Risk

People with strong risk factors for esophageal cancer (such as tylosis) should have endoscopic examinations (looking inside the esophagus through a flexible lighted tube called an endoscope) and biopsies (removal of a small sample of tissue to examine under the microscope) regularly.

Doctors recommend that people with Barrett esophagus have an upper endoscopy and biopsy done on a frequent basis. If dysplasia (abnormal cells, but not yet cancerous) is found, then an endoscopy and biopsy are usually repeated more frequently.

If the dysplasia is high grade (meaning that the cells appear very abnormal), many doctors will recommend surgery to remove the area of Barrett esophagus unless the patient is in poor health and unable to withstand the operation. Surgery is recommended because of the high risk that an adenocarcinoma-type cancer is already present (but not found) or will develop within a few years. The prognosis for these patients is relatively good. Other treatment options for certain patients with high-grade dysplasia include endomucosal resection (EMR), photodynamic therapy (PDT), and cryoablation. This monitoring and intervention strategy can help prevent cancer from developing and detect cancers early when they are more likely to respond to treatment.

How Is Cancer of the Esophagus Diagnosed?

Signs and Symptoms of Esophageal Cancer

In most cases, cancers of the esophagus are discovered 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 a cure is less likely.

Dysphagia: The most common symptom of esophageal cancer is difficulty swallowing, or dysphagia, with the sensation of food getting stuck in the throat or chest. The opening of the esophagus is often narrowed to about half of its normal width. Therefore, 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 chew their food more carefully and slowly. As the cancer continues to grow, however, this stops working and they start to eat softer foods that pass through the

esophagus more easily. The foods that typically get stuck are bread and meat. The inability to swallow may lead some people to avoid solid food completely and eat a liquid diet. Eventually, even liquids are not able to pass. 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.

Pain: In rare cases, people can have mid-chest pain or discomfort, a slight sensation of pressure, or burning. However, because these symptoms can be associated with many common problems, such as heartburn, they are often overlooked. Painful swallowing is usually a late sign of a large cancer blocking the opening of the esophagus. This pain can occur a few seconds after swallowing food or liquid as it reaches the tumor and cannot pass it.

Weight loss: About half of patients with esophageal cancer complain of unintended weight loss. This happens because they cannot swallow enough food and nutrients to maintain their weight. Early in the disease, this may go unnoticed. Cancer also can cause a decreased appetite and can affect a person's metabolism.

Other symptoms: Hoarseness, hiccups, pneumonia, and high blood calcium levels are usually signs of more advanced cancer of the esophagus. Sometimes the cancer will bleed. If there is enough blood, stools may turn black. This can also occur with other cancers and with some benign (noncancerous) diseases and does not always indicate esophageal cancer.

If you have any of the following symptoms, please see a doctor right away for appropriate examination and diagnosis:

- dysphagia (a feeling of food getting stuck in your throat or chest)
- significant weight loss without dieting
- avoidance of solid food because of pain when you swallow
- hiccups and dysphagia together

If you have certain symptoms or if the results of screening tests (in high-risk individuals without symptoms) suggest that you may have esophageal cancer, your doctor will use one or more of the methods explained below to find out if esophageal cancer or another disease is present.

History and Physical Examination

The doctor will take a complete history (medical interview) to check for risk factors and symptoms. The physical exam will provide information about signs of esophageal cancer and other health problems.

Barium Swallow or Upper Gastrointestinal (GI) X-rays

Esophageal cancers grow from the wall of the esophagus into the opening of the esophagus, creating a tumor or bump inside the esophagus. A barium swallow test can show any irregularities in the normally smooth surface of the esophageal wall. Barium in liquid form is

used to coat the esophagus wall before the x-ray is taken, allowing the x-ray to show the esophagus clearly.

A barium swallow test is often the first diagnostic test in people with trouble swallowing. It can be used to identify both early and advanced cancers, although early cancers (before symptoms occur) are often found by accident while having the test for another reason. In the barium x-ray, early cancers can look like small round bumps. They also can appear as a flat, raised area called a plaque. These masses will cause the barium to coat the affected area of the esophagus unevenly. Advanced cancers look like large irregular areas and cause a narrowing of the width of the esophagus. A barium swallow test cannot be used to determine how far a cancer may have spread outside of the esophagus.

A barium swallow test can also be used to diagnose one of the more serious complications of esophageal cancer called a tracheoesophageal fistula. This occurs when the tumor destroys the tissue between the esophagus and the trachea (windpipe) and creates a hole connecting the swallowing and breathing tubes. This leads to frequent coughing and gagging and can be repaired with surgery or an endoscopy procedure.

Upper Endoscopy

An upper endoscopy is a procedure involving the use of an endoscope, which is a flexible, very narrow tube with a video camera and light on the end. During an upper endoscopy procedure, the patient is sedated (made sleepy) to allow for this narrow tube to pass through the mouth and into the esophagus and stomach. The camera is connected to a television set, allowing the doctor to see abnormalities in the wall of the esophagus clearly.

Endoscopy is an important test for diagnosing esophageal cancer. It permits the doctor to view the cancer through the scope. A biopsy (tissue sample) can be taken through the endoscope for laboratory testing to determine whether cancer is present and, if so, its type (squamous cell cancer or adenocarcinoma). If the esophageal cancer is blocking the opening (called the *lumen*) of the esophagus, then certain instruments can be used to help enlarge the opening to help food and liquid pass. This endoscopic examination can give the surgeon information for follow-up surgery, including the size and spread of the tumor and whether the tumor can be completely removed.

Computed Tomography (CT)

The CT scan is an x-ray procedure that produces detailed cross-sectional images of your body. Instead of taking one picture, as does a conventional x-ray, 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.

CT scans are not usually used to make the initial diagnosis of esophageal cancer, but they are helpful when determining the extent, called the stage, of the cancer. CT scans show the esophagus clearly and often can confirm the location of the esophageal cancer. CT scans can also show the organs next to the esophagus, as well as lymph nodes (bean-sized collections of immune cells that help fight infections and cancers) and distant organs where the cancer

might have spread. The CT scan can help to determine whether surgery is a good treatment option.

After the first set of pictures is taken, you may be asked to drink 1 or 2 pints of a radiocontrast agent, or dye, to help outline the intestine so that certain areas are not mistaken for tumors. You need to be sure to let your doctor know if you are having any difficulty swallowing.

A contrast dye may be injected through an intravenous (IV) line. This helps outline structures in the body better. A second set of pictures is then taken.

The drink and the injection can cause some flushing. Some people are allergic and get hives; rarely, more serious reactions like trouble breathing and low blood pressure can occur. It is important to tell the doctor if you have ever had a reaction to any contrast agent used for x-rays.

CT scans are more inconvenient than regular x-rays because they take longer and require you to lie still on a table while they are being done. But just like other computerized devices, CT scans are getting faster and the stay might be pleasantly short. Also, some people feel a bit confined by the ring they have to lie in when the pictures are being taken.

CT scans can also be used to guide a biopsy needle precisely into a suspected *metastasis*, or spot to which the cancer has spread. For this procedure, called a CT-guided needle biopsy, the patient remains on the CT scanning table while a radiologist advances a biopsy needle toward the location of the mass. CT scans are repeated until the doctors are confident that the needle is in the mass. A fine-needle biopsy sample (tiny fragment of tissue) or a core needle biopsy sample (a thin cylinder of tissue about one-half inch long and less than 1/8-inch in diameter) is removed and examined under a microscope.

Magnetic resonance imaging (MRI): 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. Not only does this produce cross-sectional slices of the body like a CT scanner, it can also produce slices that are parallel with the length of your body. A contrast material might be injected just as with CT scans but is used less often.

MRI scans are also very helpful in looking at the brain and spinal cord. MRI scans are a little more uncomfortable than CT scans. First, they take longer -- often up to an hour. Also, you have to be placed inside tube-like equipment, which is confining and can upset people with a fear of enclosed spaces. To stay calm, try keeping your eyes closed. Thinking of pleasant, relaxing mental images has also been shown to be helpful in making the time pass quickly. You should also feel free to ask for anti-anxiety medicines if you think this will help you. Finally, if you have a strong fear of enclosed areas, you can seek out a facility that has an

open MRI. Many cities have at least one MRI center that has an open MRI (there is not an enclosed tube).

The MRI machine also makes a thumping noise like a washing machine that you may find annoying. Some places provide headphones with music to block this out. Although most people have little difficulty managing the MRI experience, you should feel free to discuss any concerns you have with your doctor or nurse. While you are in the MRI you will be able to talk to the technician throughout the procedure.

Endoscopic Ultrasound

This is a procedure that, according to recent studies, might be even more accurate than CT scans and upper endoscopy in determining an esophageal cancer's size and stage, or how far it has spread into nearby tissues. An endoscope with a small ultrasound probe attached to its end is used. The probe sends very sensitive sound waves that penetrate deep into tissues. The sound waves that bounce off the normal tissues and the cancer are picked up by the probe and determine how deeply the tumor has invaded into the esophagus. This is the same technology that doctors use to examine the fetus in a pregnant woman. It is harmless and can detect small abnormal changes very well.

Endoscopic ultrasound can help determine how much of the tissue next to the esophagus (including nearby lymph nodes) is affected by the cancer. This helps surgeons decide which tumors can be surgically removed and which cannot.

Bronchoscopy

This procedure is similar to an upper endoscopy except in this instance the doctor looks into the trachea (windpipe) and bronchi (tubes leading from the trachea to the lung). This allows the doctor to determine whether the cancer has grown into these structures. The patient is sedated for this procedure.

Positron Emission Tomography (PET)

In this test, radioactive glucose (sugar) is injected into the vein. Because cancers use sugar much faster than normal tissues, the cancerous tissue takes up the radioactive material. A scanner can spot the radioactive deposits. This test is useful for spotting cancer that has spread to nearby lymph nodes and sites distant from the esophagus. It may be a useful test for staging the cancer.

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. The surgeon can operate instruments through the tube and remove lymph node samples and biopsy organs to see whether they contain cancer cells. This information is often important in deciding whether or not a person is likely to benefit from surgery. These procedures require you to be in the hospital and undergo general anesthesia.

Biopsy

This is the single most important test. During an endoscopy or other procedure, the doctor will remove a small piece of tissue. This tissue is then examined by a doctor called a pathologist. He or she examines the tissue to determine whether cancer cells are present and if so, their type. It usually takes a couple of days to get the results of a biopsy.

How Is Cancer of the Esophagus Staged?

Staging is the process of finding out whether the cancer has spread and, if so, how far. The treatment and prognosis (the outlook for chances of survival) for people with esophageal cancer depend, to a great extent, on the cancer's stage.

Esophageal cancer is staged with the imaging tests described above, combined with endoscopy and biopsy.

The most common system used to stage esophageal cancer is the *TNM system* of the American Joint Committee on Cancer (AJCC). The TNM system describes 3 key pieces of information. *T* refers to the size of the primary tumor and how far it has spread within the esophagus and to nearby organs. *N* refers to cancer spread to nearby lymph nodes. *M* indicates whether the cancer has metastasized (spread to distant organs).

T Stages

Tis: carcinoma in situ (the tumor has not invaded beyond the epithelium, the first or innermost layer of the esophagus)

T1: tumor invades the lamina propria (second layer) or submucosa (third layer)

T2: tumor invades the muscularis propria (fourth layer)

T3: tumor invades the adventitia (fifth and outermost layer)

T4: tumor invades nearby structures

N Stages

N0: no spread to nearby lymph nodes

N1: spread to nearby lymph nodes

M Stages

M0: no spread to distant organs

M1a: spread to distant lymph nodes

M1b: spread to distant organs

Information about the tumor, lymph nodes, and metastasis is then combined to assign a stage of disease. This process is called stage grouping. The stages are described using the number 0 and Roman numerals from I to IV:

Stage 0 (Tis, N0, M0): This is the earliest stage of esophageal cancer. This stage is also called *carcinoma in situ*, meaning that cancer cells are limited to the epithelium (the part of the mucosa forming the inner lining of the esophagus). The cancer has not invaded the connective tissue beneath the epithelium. The cancer has not spread to lymph nodes or other organs.

Stage I (T1, N0, M0): Stage I means that the esophageal cancer has invaded from the epithelium into the lamina propria or the submucosa. The cancer has not grown any deeper and has not spread to lymph nodes or to distant sites.

Stage II: There are 2 substages, stage IIA and stage IIB.

Stage IIA (T2 or 3, N0, M0): In this stage, the cancer has invaded the muscularis propria and may extend through that layer into the adventitia, the connective tissue covering the outside of the esophagus. The cancer has not spread to lymph nodes or to distant sites.

Stage IIB (T1 or 2, N1, M0): The cancer may have invaded the lamina propria, submucosa, and the muscularis propria, but not the adventitia. However, it has spread to lymph nodes near the esophagus but not to distant sites.

Stage III (T3, N1, M0; OR T4, N0 or 1, M0): Cancers in this stage have spread to the adventitia and to lymph nodes near the esophagus, or they have spread beyond the adventitia into nearby organs, such as the trachea (windpipe), and may or may not have spread to the lymph nodes. The cancer has not spread to lymph nodes farther away from the esophagus or to distant sites.

Stage IV: There are 2 substages, stage IVA and stage IVB

Stage IVA (any T, any N, M1a): This stage indicates that the esophageal cancer has spread to distant lymph nodes. If the esophageal cancer is in the upper part of the chest, it has spread to lymph nodes in the neck. For cancer of the lower part of the esophagus, it has spread to lymph nodes in the abdomen.

Stage IVB (any T, any N, M1b): This stage indicates that the esophageal cancer has spread to more distant lymph nodes or other distant sites, such as the liver, bones, or brain.

Survival Rates by Stage

These numbers, from the National Cancer Data Base, describe the outcomes in 11,154 patients diagnosed in 1998. Keep in mind that this was several years ago, and treatment has improved since that time.

Stage	Percent of patients	5-Year Relative Survival Rate
0	1	52%
I	10	41%
II	21	26%
III	18	13%
IV	26	3%
Unknown	25	

The 5-year survival rate refers to the percentage of patients who live *at least* 5 years after their cancer is diagnosed. Five-year rates are used to produce a standard way of discussing prognosis. Of course, many people live much longer than 5 years. In addition, people diagnosed and treated in 2005 are likely to have improved survival rates than from 1998, due to improvements in treatment and care since that time. The 5-year *relative* survival rate incorporates the assumption that people will die of other causes and compares the observed survival with that expected for people without esophageal cancer. That means that *relative survival* only talks about deaths from esophageal cancer.

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.

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 physical health and the stage of the cancer.

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. Some insurance companies require a second opinion before they will agree to pay for treatments.

The options for early treatment of cancer of the esophagus include surgery, chemotherapy, and radiation therapy. Other treatments, such as mechanical stents and photodynamic therapy, are used as palliative treatment when all the cancer cannot be removed. Palliative treatment relieves symptoms, such as pain, but is not expected to cure the disease. Palliative treatment may be given along with treatment that is intended to cure, or can be given when a cure is not possible. Depending on the stage of the cancer and your general medical condition, different treatment options may be used alone or in combination.

It is important to discuss all treatment options as well as their possible side effects with the doctor to help make the decision that best fits your needs.

Surgery

Depending on the stage of esophageal cancer, surgery may be used to remove the cancer and some of the surrounding tissue. Surgery can also be combined with other treatments, such as chemotherapy and/or radiation therapy.

An *esophagectomy* is a surgical procedure that involves removing the part of the esophagus containing the cancer with a small amount of the proximal stomach and connecting the upper part of the esophagus, in most cases, to the remaining stomach. The stomach conduit becomes the “new esophagus.” Lymph nodes near the esophagus are also removed. The extent of the resection depends upon the stage of the tumor, its location, and the surgeon’s training. For cancers of the distal one third of the esophagus or GEJ, the part of the esophagus containing the cancer with a proximal margin of 8 to 10 cm and the upper part of the stomach are removed. Depending on the approach, the stomach may be connected to the esophagus high in the chest or to the esophagus in the neck. If the tumor is in the upper or mid portion of the esophagus, the majority of the esophagus needs to be removed to get far enough above the cancer. The stomach will then be brought up and connected to the esophagus in the neck. If the stomach cannot be used, the surgeon may replace the removed part of the esophagus with a piece of the small or large intestine. This is a complex operation because the blood supply to that piece of intestine must be preserved.

There are many different techniques and approaches used in operating on esophageal cancer. You will need to discuss this thoroughly with your surgeon, who may use pictures to describe how the operation will be done.

Surgery can cure some patients whose cancer has not spread beyond the esophagus. Unfortunately, most esophageal cancers are not found early enough for doctors to offer curative surgery as a treatment option. Therefore, it is important to understand the goal of therapy, whether it is to cure or to ease symptoms. Surgery relieves dysphagia (difficulty swallowing) in more than 80% of patients. After patients recover from the operation, they find it easier to swallow food so they are better able to eat and maintain good nutrition.

An esophagectomy is not a simple operation. Most patients remain in the hospital for 2 weeks after the surgery. Some surgeons are able to perform the operation using a laparoscopic technique. This means that small incisions are made to allow the placement of a laparoscope, which is like a tiny telescope that allows the surgeon to look into the area of interest. Then the surgery can be done with smaller incisions. This is called a minimally invasive procedure. Surgeons who perform these kinds of procedures must be highly skilled and experienced in this type of surgery.

Like most operations, surgery of the esophagus has some risks that can lead to complications and lengthy hospitalization. A heart attack or a blood clot in the lungs or the brain can occur during the operation. There may be a leak at the place where the stomach connects to the esophagus. 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.

Infection is a risk with any surgery. Strictures (narrowing) can form where the esophagus is surgically connected to the stomach and cause difficulty swallowing in about 10% to 15% of

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 a fatal complication occurring is related to the hospital and doctor's experience with these operations. A study published in 1998 found that about 3% of patients die within 1 month of having this surgery at a hospital where the operations are done often. When the hospital has less experience, the rate may be as high as 17%. For this reason, patients should not hesitate to ask the surgeon about his or her experience with this procedure and what percent of their patients have died after this surgery. The hospital selected is also important and should make survival statistics available to its patients. In general, the best outcomes are achieved with surgeons and hospitals that have the most experience.

Radiation Therapy

Radiation therapy uses high-energy radiation to kill cancer cells. External-beam radiation therapy focuses radiation from outside the body on the cancer. This type of radiation therapy is most often used to treat esophageal cancer. Internal radiation therapy, also known as brachytherapy, places radioactive material directly into the cancer.

Radiation therapy is used as the primary (main) treatment of esophageal cancer in some patients, especially people whose general health is too poor to undergo surgery. In fact, combined with chemotherapy, some doctors think radiation therapy is as effective as surgery. One recent clinical trial that compared surgery alone with radiation alone in early stage esophageal cancer found no difference in outcomes. The study was presented at the 2006 meeting of the American Society of Clinical Oncology. After surgery, radiation therapy can be used to kill tiny deposits of cancer that cannot be seen and removed during surgery. Radiation therapy can also be used to ease the symptoms of esophageal cancer such as pain, bleeding, difficulty swallowing, and symptoms caused by esophageal cancer that has spread to the brain.

In advanced esophageal cancer, radiation therapy by itself does not cure esophageal cancer, but it can be a very effective therapy in relieving dysphagia. More than 70% of all patients treated with radiation will have at least temporary relief from dysphagia (difficulty swallowing). The advantage of this therapy for relief of symptoms is that it causes relatively few side effects. Most often, radiation therapy is combined with surgery and/or chemotherapy. Use of radiation therapy combined with chemotherapy might be curative for some people and provide good relief of symptoms and extend survival for others.

Brachytherapy is useful in shrinking tumors so a patient can swallow more easily. In this procedure, radioactive seeds are placed into the tumor through an endoscope. It is used mainly to relieve symptoms because it cannot be used to treat a very large area.

Side effects of radiation therapy may include skin problems, upset stomach, diarrhea, and fatigue. The major problem people have is pain with swallowing as the radiation kills the normal lining cells of the esophagus. This will go away as these cells regrow. Most of the side effects are temporary. Chemotherapy may also make the side effects of radiation worse. Chest radiation therapy may cause lung damage and lead to difficulty breathing and shortness of breath. It is important to talk with your doctor before and during treatment about ways to reduce the side effects of treatment.

Chemotherapy

Chemotherapy involves the use of drugs that are given through a vein or by mouth. These drugs enter the bloodstream and reach all areas of the body, making this treatment useful for cancer that has spread to organs beyond the esophagus. Depending on the type and stage of esophageal cancer, chemotherapy may be given as a main (primary) treatment or before (neoadjuvant) or after (adjuvant) surgery.

Primary chemotherapy will usually not cure esophageal cancer unless radiation therapy and, in some cases, surgery is also used. There are 3 situations in which chemotherapy is used:

Palliative therapy: The goal of palliative therapy is to control symptoms, such as dysphagia (difficulty swallowing) and pain. Palliative therapy can be used in combination with other treatments that are intended to cure disease, or it can be used alone when a cure is not possible.

Preoperative chemotherapy: Chemotherapy may be given before surgery to reduce the tumor size and possibly allow a more complete surgical removal of the tumor. Use of chemotherapy alone in this situation is still being studied and is not a standard treatment.

Chemoradiotherapy: Chemotherapy together with radiation therapy can shrink the cancer and is sometimes used before surgery to make surgery easier. Many doctors think the chances for cure are better if chemoradiotherapy is given before surgery. A recent report from a national group of researchers called CALGB found that the triple therapy is better than surgery alone. Patients who received chemoradiotherapy followed by surgery had a 5-year survival of 39% versus 16% for people who only had surgery. The study was presented at the 2006 meetings of the American Society of Clinical Oncology. Other studies have not yet shown this benefit. Chemotherapy and radiation therapy may also be used together in some patients who are not able to undergo surgery. Many people think this may be as effective as surgery, although there are no clinical trials to prove this.

The chemotherapy drugs used to treat esophageal cancer include 5-fluorouracil (5-FU), cisplatin, carboplatin, bleomycin, mitomycin, doxorubicin, methotrexate, paclitaxel, vinorelbine, topotecan, and irinotecan. In chemoradiotherapy, the most frequently used drugs are 5-FU and cisplatin given together. About 10% to 40% of patients respond to these drugs and their tumors shrink significantly. About 17% to 50% of patients with advanced disease respond to combinations of these drugs.

Chemotherapy drugs kill cancer cells but also damage some normal cells, causing side effects. Therefore, careful attention must be given to avoid or minimize these side effects, which depend on the specific drugs used, their dose, and the length of treatment. Temporary side effects might include nausea and vomiting, loss of appetite, loss of hair, and mouth sores. It is important for people receiving chemotherapy to tell the cancer care team right away if they have any of these side effects, so they can be managed effectively.

Because chemotherapy can damage the blood-producing cells of the bone marrow, patients may have low blood cell counts. This can result in an increased chance of infection (because of a shortage of white blood cells), bleeding or bruising after minor cuts or injuries (due to a shortage of blood platelets), and fatigue or shortness of breath (due to low red blood cell counts).

Most side effects disappear once treatment is stopped. There are medications or strategies to treat many of the temporary side effects of chemotherapy. For example, drugs to prevent or reduce nausea and vomiting can be given.

Photodynamic Therapy

Photodynamic therapy (PDT) is a method that is generally used when an esophageal cancer has been found very early, for example in a biopsy from a Barrett esophagus, or has come back after other treatment. PDT begins with the injection of a nontoxic chemical into the blood. This chemical is allowed to collect in the tumor for a few days. A special type of laser light is then focused on the cancer through an endoscope. This light causes changes in the chemical that has collected inside the cancer cells. The light changes the nontoxic chemical into a new chemical that can kill cancer cells.

The advantage of PDT is that it can kill cancer cells with very little harm to normal cells. One drawback is that the chemical must be activated by light, so only cancers near the inner surface of the esophagus (that can be reached by shining a special light through the endoscope) can be treated in this way. This light cannot reach cancers that have spread deeper into the esophagus or to other organs.

Side effects of PDT include redness or discoloration of the skin and sensitivity to the sun or to other light sources. These side effects can last for up to 6 weeks after therapy and, in some cases, may be severe. Because of this, patients are usually confined indoors for 6 weeks.

In preliminary studies, this treatment has cured some very early esophageal cancers that have not spread to deeper tissues. However, the length of follow-up time in these studies was short. If PDT is being used with the intent of curing a cancer, doctors should be certain that the cancer has not spread deeper, since the light used in PDT may only reach those cancer cells near the surface of the esophagus. Right now, PDT is being used to treat Barrett esophagus and very early esophageal cancers found in Barrett esophagus.

The major use of PDT is palliative treatment of advanced cancers that are blocking the esophagus and have come back after radiation therapy. In this situation, PDT does not

destroy all of the cancer, but it kills enough of the cancer to improve the patient's ability to swallow. The exact role of PDT in the treatment of esophageal cancer is currently being evaluated in studies that compare results of PDT with other treatments, such as surgery or use of lasers to vaporize the cancer. Researchers are also working to improve PDT by developing new photosensitizing drugs and evaluating new ways of delivering the proper amount of light to the cancer.

Clinical Trials

You 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 deciding 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 one way to get state-of-the-art cancer care. Still, they are not right for everyone.

Here we will give you a brief review of clinical trials. Talking to your health care team, your family, and your friends can help you make the best treatment choice for you.

What Are Clinical Trials?

Clinical trials are carefully controlled research studies that are done with patients. These studies test whether a new treatment is safe and how well it works in patients, or they may test new ways to diagnose or prevent a disease. Clinical trials have led to many advances in cancer prevention, diagnosis, and treatment.

The Purpose of Clinical Trials

Clinical trials are done to get a closer look at promising new treatments or procedures in patients. A clinical trial is only done when there is good reason to believe that the treatment, test, or procedure being studied may be better than the one used now. Treatments used in clinical trials are often found to have real benefits and may go on to become tomorrow's standard treatment.

Clinical trials can focus on many things, such as:

- new uses of drugs that are already approved by the US Food and Drug Administration (FDA)
- new drugs that have not yet been approved by the FDA
- non-drug treatments (such as radiation therapy)
- medical procedures (such as types of surgery)
- herbs and vitamins
- tools to improve the ways medicines or diagnostic tests are used
- medicines or procedures to relieve symptoms or improve comfort
- combinations of treatments and procedures

Researchers conduct studies of new treatments to try to answer the following questions:

- Is the treatment helpful?
- What's the best way to give it?
- Does it work better than other treatments already available?

- What side effects does the treatment cause?
- Are there more or fewer side effects than the standard treatment used now?
- Do the benefits outweigh the side effects?
- In which patients is the treatment most likely to be helpful?

Phases of Clinical Trials

There are 4 phases of clinical trials, which are numbered I, II, III, and IV. We will use the example of testing a new cancer treatment drug to look at what each phase is like.

Phase I clinical trials: The purpose of a phase I study is to find the best way to give a new treatment safely to patients. The cancer care team closely watches patients for any harmful side effects.

For phase I studies, the drug has already been tested in lab and animal studies, but the side effects in patients are not fully known. Doctors start by giving very low doses of the drug to the first patients and increase the doses for later groups of patients until side effects appear or the desired effect is seen. Doctors are hoping to help patients, but the main purpose of a phase I trial is to test the safety of the drug.

Phase I clinical trials are often done in small groups of people with different cancers that have not responded to standard treatment, or that keep coming back (recurring) after treatment. If a drug is found to be reasonably safe in phase I studies, it can be tested in a phase II clinical trial.

Phase II clinical trials: These studies are designed to see if the drug works. Patients are given the best dose as determined from phase I studies. They are closely watched for an effect on the cancer. The cancer care team also looks for side effects.

Phase II trials are often done in larger groups of patients with a specific cancer type that has not responded to standard treatment. If a drug is found to be effective in phase II studies, it can be tested in a phase III clinical trial.

Phase III clinical trials: Phase III studies involve large numbers of patients -- most often those who have just been diagnosed with a specific type of cancer. Phase III clinical trials may enroll thousands of patients.

Often, these studies are randomized. This means that patients are randomly put in one of two (or more) groups. One group (called the control group) gets the standard, most accepted treatment. Other group(s) get the new one(s) being studied. All patients in phase III studies are closely watched. The study will be stopped early if the side effects of the new treatment are too severe or if one group has much better results than the others.

Phase III clinical trials are usually needed before the FDA will approve a treatment for use by the general public.

Phase IV clinical trials: Once a drug has been approved by the FDA and is available for all patients, it is still studied in other clinical trials (sometimes referred to as phase IV studies). This way more can be learned about short-term and long-term side effects and safety as the drug is used in larger numbers of patients with many types of diseases. Doctors can also learn more about how well the drug works, and if it might be helpful when used in other ways (such as in combination with other treatments).

What It Will Be Like to Be in a Clinical Trial

If you are in a clinical trial, you will have a team of experts taking care of you and watching your progress very carefully. Depending on the phase of the clinical trial, you may receive more attention (such as having more doctor visits and lab tests) than you would if you were treated outside of a clinical trial. Clinical trials are specially designed to pay close attention to you.

However, there are some risks. No one involved in the study knows in advance whether the treatment will work or exactly what side effects will occur. That is what the study is designed to find out. While most side effects go away in time, some may be long-lasting or even life threatening. Keep in mind, though, that even standard treatments have side effects. Depending on many factors, you may decide to enter (enroll in) a clinical trial.

Deciding to Enter a Clinical Trial

If you would like to take part in a clinical trial, you should begin by asking your doctor if your clinic or hospital conducts clinical trials. There are requirements you must meet to take part in any clinical trial. But whether or not you enter (enroll in) a clinical trial is completely up to you.

Your doctors and nurses will explain the study to you in detail. They will go over the possible risks and benefits and give you a form to read and sign. The form says that you understand the clinical trial and want to take part in it. This process is known as giving your informed consent. Even after reading and signing the form and after the clinical trial begins, you are free to leave the study at any time, for any reason. Taking part in a clinical trial does not keep you from getting any other medical care you may need.

To find out more about clinical trials, talk to your cancer care team. Here are some questions you might ask:

- Is there a clinical trial that I could take part in?
- What is the purpose of the study?
- What kinds of tests and treatments does the study involve?
- What does this treatment do? Has it been used before?
- Will I know which treatment I receive?
- What is likely to happen in my case with, or without, this new treatment?
- What are my other choices and their pros and cons?
- How could the study affect my daily life?
- What side effects can I expect from the study? Can the side effects be controlled?

- Will I have to stay in the hospital? If so, how often and for how long?
- Will the study cost me anything? Will any of the treatment be free?
- If I am harmed as a result of the research, what treatment would I be entitled to?
- What type of long-term follow-up care is part of the study?
- Has the treatment been used to treat other types of cancers?

How Can I Find Out More About Clinical Trials That Might Be Right for Me?

The American Cancer Society offers a clinical trials matching service for patients, their family, and friends. You can reach this service at 1-800-303-5691 or on our Web site at <http://clinicaltrials.cancer.org>.

Based on the information you give about your cancer type, stage, and previous treatments, this service can put together a list of clinical trials that match your medical needs. The service will also ask where you live and whether you are willing to travel so that it can look for a treatment center that you can get to.

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.

For even more information on clinical trials, the American Cancer Society has a document called *Clinical Trials: What You Need to Know*. You can read this on the Web site, www.cancer.org, or have it sent to you by calling 1-800-ACS-2345.

Complementary and Alternative Therapies

When you have cancer you are likely to hear about ways to treat your cancer or relieve symptoms that are different from mainstream (standard) medical treatment. These methods can include vitamins, herbs, and special diets, or methods such as acupuncture or massage—among many others. You may have a lot of questions about these treatments. Here are some you may have thought of already:

- How do I know if a non-standard treatment is safe?
- How do I know if it works?
- Should I try one or more of these treatments?
- What does my doctor know/think about these methods? Should I tell the doctor that I'm thinking about trying them?
- Will these treatments cause a problem with my standard medical treatment?
- What is the difference between "complementary" and "alternative" methods?
- Where can I find out more about these treatments?

The Terms Can Be Confusing

Not everyone uses these terms the same way, so it can be confusing. The American Cancer Society uses *complementary* to refer to medicines or methods that are used *along with* your

regular medical care. *Alternative* medicine is a treatment used *instead of* standard medical treatment.

Complementary Methods: Complementary treatment methods, for the most part, are not presented as cures for cancer. Most often they are used to help you feel better. Some methods that can be used in a complementary way are meditation to reduce stress, acupuncture to relieve pain or peppermint tea to relieve nausea. There are many others. Some of these methods are known to help, while others have not been tested. Some have been proven not to be helpful. A few have even been found harmful. However, some of these methods may add to your comfort and well-being.

There are many complementary methods that you can safely use right along with your medical treatment to help relieve symptoms or side effects, to ease pain, and to help you enjoy life more. For example, some people find methods such as aromatherapy, massage therapy, meditation, or yoga to be useful.

Alternative Treatments: Alternative treatments are those that are used instead of standard medical care. These treatments have not been proven safe and effective in clinical trials. Some of these methods may even be dangerous and some have life-threatening side effects. The biggest danger in most cases is that you may lose the chance to benefit from standard treatment. Delays or interruptions in your standard medical treatment may give the cancer more time to grow.

Deciding What to Do

It is easy to see why people with cancer may consider alternative methods. You want to do all you can to fight the cancer. Sometimes mainstream treatments such as chemotherapy can be hard to take, or they may no longer be working.

Sometimes people suggest that their method can cure your cancer without having serious side effects, and it's normal to want to believe them. But the truth is that most non-standard methods of treatment have not been tested and proven to be effective for treating cancer.

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

- Talk to your doctor or nurse about any method you are thinking about using.
- Check the list of "red flags" below.
- Contact the American Cancer Society at 1-800-ACS-2345 to learn more about complementary and alternative methods in general and to learn more about the specific methods you are thinking about.

Red Flags

You can use the questions below to spot treatments or methods to avoid. A "yes" answer to any one of these questions should raise a "red flag."

- Does the treatment promise a cure for all or most cancers?
- Are you told not to use standard medical treatment?

- Is the treatment or drug a "secret" that only certain people can give?
- Does the treatment require you to travel to another country?
- Do the promoters attack the medical or scientific community?

The Decision Is Yours

Decisions about how to treat or manage your cancer are always yours to make. If you are thinking about using a complementary or alternative method, be sure to learn about the method and talk to your doctor about it. With reliable information and the support of your health care team, you may be able to safely use the methods that can help you while avoiding those that could be harmful.

Treatment of Cancer of the Esophagus by Stage

Stage 0: Surgery is the best therapy for this very early stage of disease and offers the best chance for cure.

Stage I: Most patients with stage I esophageal cancer have their cancer surgically removed. Chemotherapy and radiation therapy may be given before surgery.

Patients who cannot undergo surgery because of other serious health problems can be treated with radiation therapy in combination with chemotherapy. Patients who have received chemotherapy and radiation therapy may be cured and not need surgery at all. Combined chemotherapy and radiation therapy is an option for people who cannot or do not want to undergo surgery.

Stage II: Treatment options for people with stage II esophageal cancer are surgery or chemoradiation followed by surgery. In some instances, the surgery may not be needed after chemoradiation therapy if there has been a complete disappearance of detectable cancer.

Stage III: Stage III disease is treated much like stage II disease. One treatment is surgery alone. However, many doctors prefer to give chemoradiation therapy before the surgery. In some instances, the cancer becomes completely undetectable with the chemoradiation therapy, and surgery may be avoided.

Stage IV: Because stage IV esophageal cancer has spread to distant organs, cure is not usually possible. Palliative therapies, such as radiation therapy, to relieve trouble swallowing and other symptoms may be needed. Therapies, such as chemotherapy, may also be given with the intent to treat the cancer, but some people may prefer not to undergo treatments with significant side effects, and receive only those therapies that will keep them comfortable and add to their quality of life.

Palliative Therapy

Palliative therapy is intended to relieve symptoms but is not expected to be a cure. Depending on individual circumstances, palliative therapy may be given in combination with

other treatments intended to cure the disease or alone when a cure is not possible. The main purpose of palliative therapy is to improve the patient's comfort and quality of life.

Esophageal dilatation: In this procedure, a cylindrical device is pushed through an obstruction to open it up and allow better swallowing. This can be repeated. It has a small risk of perforation – that is, tearing a hole in the esophagus. Relief usually lasts up to 2 weeks; therefore, dilatation is often followed by other palliative therapies.

Radiation therapy: External-beam radiation can help relieve symptoms from advanced esophageal cancer. If external beam radiation therapy has already been given, brachytherapy is another option. Brachytherapy is especially useful in helping to relieve an obstructed esophagus.

Electrocoagulation: This method involves burning the tumor off with electric current. This treatment can help relieve obstruction in certain instances.

Photodynamic therapy: It can be useful as a palliative treatment in some cases. However, it can only be used to remove superficial layers of tumor tissue and is therefore limited in relieving esophageal obstruction.

Laser endoscopy: This method involves aiming laser beams at the cancer through an endoscope, so a surgical incision is not needed. Patients with tumors that are partially blocking the esophagus may benefit from vaporization and coagulation of the cancerous tissues with a special laser called a neodymium: yttrium-aluminum-garnet (Nd:yag) laser. About 70% to 80% of patients will benefit from laser endoscopy. However, the procedure needs to be repeated every 6 to 8 weeks. In some cases, the Nd:yag laser therapy is performed before an esophageal stent is placed.

Esophageal metallic stents: These are metal mesh devices that are placed via endoscopy into the esophagus across the length of the tumor. There they self-expand to help keep the esophagus open. The success of these stents depends on the location of the tumor and the type of stent selected. Stents will relieve dysphagia (difficulty swallowing) in more than 80% of treated patients.

Pain management: Pain control is an important concern for people with cancer of the esophagus. Growth of the cancer around certain nerves may cause severe pain. However, there are proven ways to relieve pain caused by cancer. People with cancer should let their cancer care team know immediately if they are in pain. The cancer care team can provide medications and other palliative treatments to relieve pain and other symptoms.

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 NCCN, made up of experts from 20 of the nation's leading cancer centers, develops cancer treatment guidelines for doctors to use when treating patients. Those are available on the NCCN Web site (www.nccn.org).

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.

What Should You Ask Your Doctor About Cancer of the Esophagus?

It is important for people with cancer and their families to have honest, open discussions with their cancer care team. The cancer care team wants to answer all of these questions, no matter how trivial they might seem to the patient. For instance, people with esophageal cancer can 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?
- What treatment choices do I have?
- What treatment(s) do you recommend and why?
- Based on what you've learned about my cancer, what is my prognosis?
- What possible risks or side effects are there to the treatments you suggest?
- What are the chances of recurrence of my cancer with these treatment plans?
- What should I do to be ready for treatment?
- Will I have special nutritional needs due to the esophageal cancer?
- Where can I find more information and support?

You will no doubt have other questions about your personal situation. Be sure to write down your questions so that you remember to ask them during each visit with your cancer care team. Also 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?

Completing treatment can be both stressful and exciting. You will be relieved to finish treatment, yet it is hard not to worry about cancer coming back. (When cancer returns, it is called recurrence.) This is a very common concern among those who have had cancer.

Follow-up Care

After your treatment is over, it is very important to keep all follow-up appointments. During these visits, your doctors will ask about symptoms, do physical exams, and order blood tests or imaging studies such as upper gastrointestinal (GI) x-rays, barium swallows, and other imaging studies (such as CT scans), or upper endoscopy. Follow-up is needed to check for cancer recurrence or spread, as well as 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 be permanent. 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.

New Symptoms: It is important that you report any new symptoms to the doctor right away, especially if they include dysphagia (difficulty swallowing) or chest pain. Early treatment can relieve many symptoms and improve your quality of life.

Nutrition: Cancer of the esophagus often causes difficulty swallowing. For this reason, weight loss and weakness due to poor nutrition are common problems. A team of doctors and a nutritionist can work together with you to provide nutritional supplements and information about your individual nutritional needs. This can be valuable in helping you to maintain your weight and nutritional intake.

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

Smoking: If you smoke, it is very important to quit. Quitting helps improve appetite and overall health and can reduce the chance of developing a new cancer.

It is also important to keep medical insurance. Even though no one wants to think of their cancer coming back, it is always a possibility. If it happens, the last thing you want is to have to worry about paying for treatment. Many people have been bankrupted by cancer recurrence.

Seeing a New Doctor

At some point after your cancer diagnosis and treatment, you may find yourself in the office of a new doctor. Your original doctor may have moved or retired, or you may have moved or changed doctors for some reason. It is important that you be able to give your new doctor the exact details of your diagnosis and treatment. Make sure you have the following information handy:

- a copy of your pathology report from any biopsy or surgery
- if you had surgery, a copy of your operative report
- if you were hospitalized, a copy of the discharge summary that every doctor must prepare when patients are sent home from the hospital
- finally, since some drugs can have long-term side effects, a list of your drugs, drug doses, and when you took them

Lifestyle Changes to Consider During and After Treatment

Having cancer and dealing with treatment can be time-consuming and emotionally draining, but it can also 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 begin this process during cancer treatment.

Make Healthier Choices

Think about your life before you learned you had cancer. Were there things you did that might have made you less healthy? Maybe you drank too much alcohol, or ate more than you needed, or smoked, or didn't exercise very often. Emotionally, maybe you kept your feelings bottled up, or maybe you let stressful situations go on too long.

Now is not the time to feel guilty or to blame yourself. However, you can start making changes today that can have positive effects for the rest of your life. Not only will you feel better but you will also be healthier. What better time than *now* to take advantage of the motivation you have as a result of going through a life-changing experience like having cancer?

You can start by working on those things that you feel most concerned about. 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's Quitline[®] tobacco cessation program at 1-800-ACS-2345.

Diet and Nutrition

Eating right can be a challenge for anyone, but it can get even tougher during and after cancer treatment. For instance, treatment often may change your sense of taste. Nausea can be a problem. You may lose your appetite for a while and lose weight when you don't want to. On the other hand, some people gain weight even without eating more. This can be frustrating, too.

If you are losing weight or have taste problems during treatment, do the best you can with eating and remember that these problems usually improve over time. You may want to ask your cancer team for a referral to a dietitian, an expert in nutrition who can give you ideas on how to fight some of the side effects of your treatment. You may also find it helps to eat small portions every 2 to 3 hours until you feel better and can go back to a more normal schedule.

One of the best things you can do after treatment is to put healthy eating habits into place. You will be surprised at the long-term benefits of some simple changes, like increasing the variety of healthy foods you eat. Try to eat 5 or more servings of vegetables and fruits each day. Choose whole grain foods instead of white flour and sugars. Try to limit meats that are high in fat. Cut back on processed meats like hot dogs, bologna, and bacon. Get rid of them altogether if you can. If you drink alcohol, limit yourself to 1 or 2 drinks a day at the most. And don't forget to get some type of regular exercise. The combination of a good diet and

regular exercise will help you maintain a healthy weight and keep you feeling more energetic.

Rest, Fatigue, Work, and Exercise

Fatigue is a very common symptom in people being treated for cancer. This is often not an ordinary type of tiredness but a “bone-weary” exhaustion that doesn’t get better with rest. For some, this fatigue lasts a long time after treatment, and can discourage them from physical activity.

However, exercise can actually help you reduce fatigue. Studies have shown that patients who follow an exercise program tailored to their personal needs feel physically and emotionally improved and can cope better.

If you are ill and need to be on bed rest during treatment, it is normal to expect your fitness, endurance, and muscle strength to decline some. Physical therapy can help you maintain strength and range of motion in your muscles, which can help fight fatigue and the sense of depression that sometimes comes with feeling so tired.

Any program of 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 3 times a week. If you haven’t exercised in a few years but can still get around, you may want to think about taking short walks.

Talk with your health care team before starting, and get their opinion about your exercise plans. Then, try to get an exercise buddy so that 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, though, you will need to balance activity with rest. It is okay to rest when you need to. It is really hard for some people to allow themselves to do that when they are used to working all day or taking care of a household. (For more information about fatigue, please see the publication, "Cancer Related Fatigue and Anemia Treatment Guidelines for Patients."

Exercise can improve your physical and emotional health.

- It improves your cardiovascular (heart and circulation) fitness.
- It strengthens your muscles.
- It reduces fatigue.
- It lowers anxiety and depression.
- It makes you feel generally happier.
- It helps you feel better about yourself.

And long term, we know that exercise plays a role in preventing some cancers. The American Cancer Society, in its guidelines on physical activity for cancer prevention, recommends that adults take part in at least 1 physical activity for 30 minutes or more on 5

days or more of the week. Children and teens are encouraged to try for at least 60 minutes a day of energetic physical activity on at least 5 days a week.

How About Your Emotional Health?

Once your treatment ends, you may find yourself overwhelmed by emotions. This happens to a lot of people. You may have been going through so much during treatment that you could only focus on getting through your treatment.

Now you may find that you think about the potential of your own death, or the effect of your cancer on your family, friends, and career. You may also begin to re-evaluate your relationship with your spouse or partner. Unexpected issues may also cause concern -- for instance, as you become healthier and have fewer doctor visits, you will see your health care team less often. That can be a source of anxiety for some.

This is an ideal time to seek out emotional and social 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 individual counselors.

Almost everyone who has been through cancer can benefit from getting some type of support. 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 realistic to go it all by yourself. And your friends and family may feel shut out if you decide not to 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-ACS-2345 and we can put you in touch with an appropriate group or resource.

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 healthy choices and feeling as well as possible, physically and emotionally.

What Happens if Treatment Is No Longer Working?

If cancer continues to grow after one kind of treatment, or if it returns, it is often 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. On the other hand, when a person has received several different medical treatments and the cancer has not been cured, over time the cancer tends to become resistant to all treatment. At this time it's important to weigh the possible limited benefit of a new treatment against the possible downsides, including continued doctor visits and treatment side effects.

Everyone has his or her own way of looking at this. Some people may want to focus on remaining comfortable during their limited time left.

This is likely to be the most difficult time in your battle with cancer -- when you have tried everything medically within reason and it's just not working anymore. Although your doctor may offer you new treatment, you need to consider that at some point, continuing treatment is not likely to improve your health or change your prognosis or survival.

If you want to continue treatment to fight your cancer as long as you can, you still need to consider the odds of more treatment having any benefit. In many cases, your doctor can estimate the response rate for the treatment you are considering. Some people are tempted to try more chemotherapy or radiation, for example, even when their doctors say that the odds of benefit are less than 1%. In this situation, you need to think about and understand your reasons for choosing this plan.

No matter what you decide to do, it is important that you be as comfortable as possible. Make sure you are asking for and getting treatment for any symptoms you might have, such as pain. This type of treatment is called "palliative" treatment.

Palliative treatment helps relieve these symptoms, but is not expected to cure the disease; its main purpose is to improve your quality of life. Sometimes, the treatments you get to control your symptoms are similar to the treatments used to treat cancer. For example, radiation therapy might be given to help relieve bone pain from bone metastasis. Or chemotherapy might be given to help shrink a tumor and keep it from causing a bowel obstruction. But this is not the same as receiving treatment to try to cure the cancer.

At some point, you may benefit from hospice care. Most of the time, this can be given at home. Your cancer may be causing symptoms or problems that need attention, and hospice focuses on your comfort. You should know that receiving hospice care doesn't mean you can't have treatment for the problems caused by your cancer or other health conditions. It just means that the focus of your care is on living life as fully as possible and feeling as well as you can at this difficult stage of your cancer.

Remember also that maintaining hope is important. 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. In a way, pausing at this time in your cancer treatment is an opportunity to refocus on the most important things in your life. This 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.

What's New in Esophageal Cancer Research and Treatment?

Research on the treatment and prevention 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.

They expect that additional progress will lead to new tests for finding esophageal cancer at an earlier, more curable stage. Understanding these changes will eventually lead to new gene therapies that repair the abnormal DNA changes in esophageal cancer cells.

Drug treatment: Several clinical trials are in progress to test new ways to combine drugs already known to be active against esophageal cancer to improve their effectiveness are also being done. Other studies are testing the best ways to combine chemotherapy with radiation therapy.

New drugs that target certain substances in the cancer cell are becoming available. This targeted therapy has been successful in other tumors and is now being tested in esophageal cancer. Likewise, drugs that block new blood vessel formation (antiangiogenesis agents) are also becoming available. They have had some success in treating other cancers and will be tested in esophageal cancer.

Immunotherapy: Experimental treatments that boost the patient's immune reaction to fight esophageal cancer more effectively are being tested in clinical trials.

One approach to immunotherapy involves the use of monoclonal antibodies, which are made in the laboratory and then injected into patients to seek out esophageal cancer cells that contain excess amounts of proteins like carcinoembryonic antigen (CEA) or the HER-2 oncogene. Clinical trials currently in progress are testing these antibodies against esophageal adenocarcinoma-type cancer.

Screening and prevention: As the rate of adenocarcinoma rises, efforts are being made to reduce obesity, a major risk factor for this form of cancer (and several types as well). In people with Barrett esophagus, researchers are investigating tests to determine which patients will go on to develop cancer. They are also studying new ways to destroy Barrett mucosa and promote its replacement by normal mucosa.

Additional Resources

More Information From Your American Cancer Society

We have selected 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-ACS-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)

Pain Control: A Guide for People with Cancer and Their Families (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)

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

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

Caregiving: A Step-By-Step Resource for Caring for the Person with Cancer at Home

National Organizations and Web Sites*

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

National Cancer Institute
Telephone: 1-800-4-CANCER; TYY: 1-800-332-8615
Internet Address: www.cancer.gov

National Coalition for Cancer Survivorship
Telephone: 1-877-NCCS-YES (622-7937)
Internet Address: www.canceradvocacy.org

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

The American Cancer Society is happy to address almost any cancer-related topic. If you have any more questions, please call us at 1-800-ACS-2345 at any time, 24 hours a day.

References

American Cancer Society. *Cancer Facts and Figures 2008*. Atlanta, Ga: American Cancer Society; 2008.

American Joint Committee on Cancer. *AJCC Cancer Staging Manual*. 6th ed. New York, NY: Springer; 2002:91-95.

Burmeister BH, Smithers BM, GebSKI V, et al. Surgery alone versus chemoradiotherapy followed by surgery for resectable cancer of the oesophagus: a randomised controlled phase III trial. *Lancet Oncology*. 2005;6:659-668.

Enzinger PC, Mayer RJ. Esophageal cancer. *New Engl J Med*. 2003;349:2241-2252.

Kleinberg LR, Forastiere AA, Heitmiller RF. Cancer of the Esophagus. In: Abeloff MD, Armitage JO, Lichter AS, Niederhuber JE, Kastan MB, McKenna WG, eds. *Clinical Oncology*. Philadelphia, PA:Elsevier; 2004:1787-1818.

Koshy M, Esiashvilli N, Landry JC, et al. Multiple management modalities in esophageal cancer. *The Oncologist*. 2004;9:137-146 and 147-159.

Posner MC, Forastiere AA, Minsky B. Cancer of the Esophagus. In: DeVita VT, Hellman S, Rosenberg SA, eds. *Cancer: Principles and Practice of Oncology*. Philadelphia, PA: Lippincott-Williams & Wilkins; 2005:861-908.

Shaheen N, Ransohoff DF. Gastroesophageal reflux, Barrett esophagus, and esophageal cancer: scientific review. *JAMA*. 2002; 287:1972-1981.

Souza RF, Spechler SJ. Concepts in the prevention of adenocarcinoma of the distal esophagus and proximal stomach. *CA Cancer J Clin*. 2005;55:334-351.

Swisher SG, Ajani JA, Komaki RK, Ferguson MK. Neoplasms of the Esophagus. In: Kufe DW, Pollock RE, Weichselbaum RR, Bast RC, Gansler TS, Holland JF, Frei E, eds. *Cancer Medicine*. 6th ed. Hamilton, Ont: BC Decker; 2003:1499-1514.

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For additional assistance please contact your American Cancer Society
1 - 800 - ACS-2345 or www.cancer.org