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Stomach Cancer

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As an organization whose mission includes providing free education and support services internationally to stomach cancer patients, families, and caregivers, Debbie's Dream Foundation: Curing Stomach Cancer (DDF) is dedicated to raising awareness about stomach cancer, advancing funding for research, and seeking the ultimate goal of making the cure for stomach cancer a reality. DDF is proud to support this important and comprehensive resource for patients and their families. DebbiesDream.org



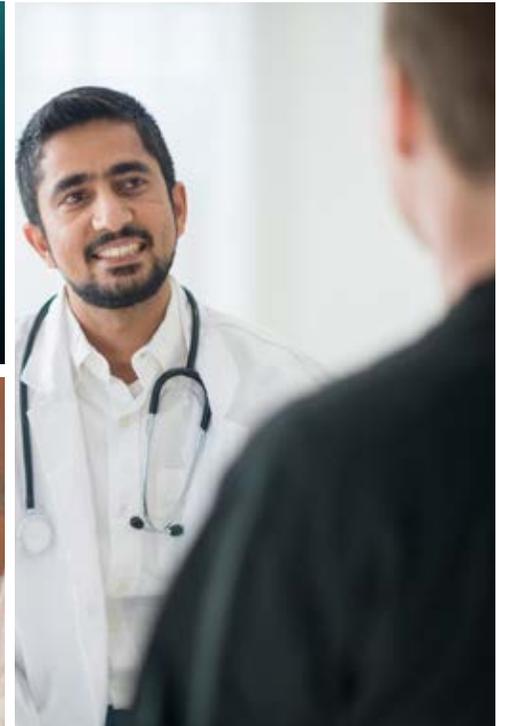
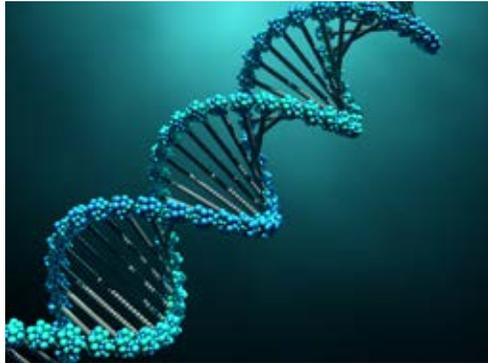
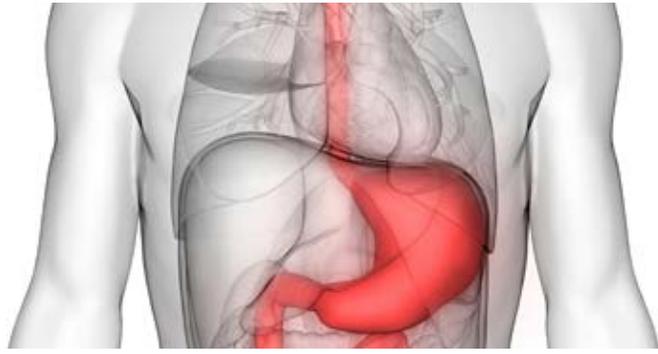
Hope for Stomach Cancer

We are a nonprofit that is focused on serving the stomach cancer community starting with the patient and their granular immediate needs. Hope for Stomach Cancer is dedicated to our mission which is to provide support, resources and awareness to those affected by stomach cancer. Through research, early detection and prevention, we serve the stomach cancer community helping to save lives and working to find a cure. We are pleased to support the NCCN Guidelines for Patients®: Stomach Cancer as an invaluable resource for those facing stomach cancer. <https://stocan.org/>



No Stomach For Cancer

We are an organization that works diligently to advance stomach cancer education and awareness within the medical and scientific community and to share that information with patients and their caregivers. In keeping with the organization's mission, NSFC supports research efforts for screening, early detection, treatment and prevention of stomach cancer. No Stomach For Cancer is proud to support this comprehensive guideline for patients and their families. nostomachforcancer.org



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Stomach cancer basics

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You've learned that you have stomach cancer. It's normal to feel shocked and confused. This chapter provides an introduction to stomach cancer. This information may help you start planning for treatment.

The stomach

The stomach is a large, hollow organ in the digestive system. The digestive system breaks down food for the body to use. In this system, the stomach is one of four organs that make up the gastrointestinal tract. **See Figure 1.**

Food is transferred from your mouth to your stomach through the esophagus. In the stomach, food is

broken down into a liquid. From the stomach, food enters the small intestine where nutrients are absorbed into the bloodstream. The large intestine prepares unused food to be moved out of the body.

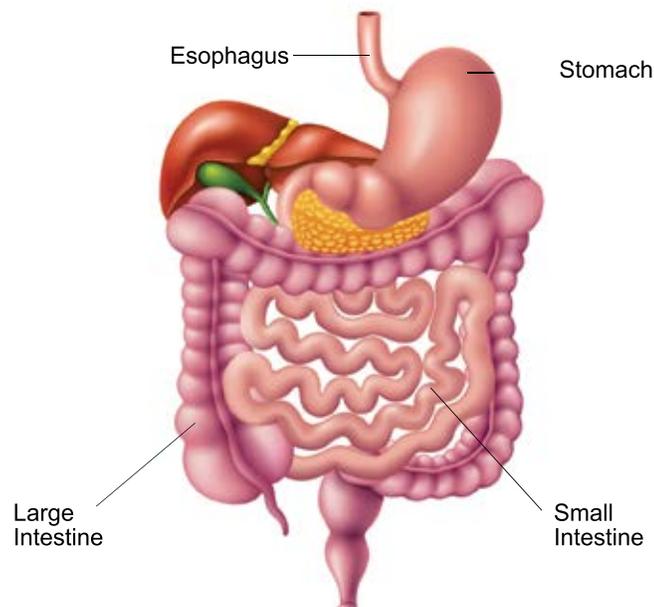
The stomach wall

The wall of the stomach is made of four main layers. **See Figure 2.** The inner layer that has contact with food is called the mucosa. It is made of three sublayers—the epithelium, lamina propria, and muscularis mucosae.

Epithelium makes a sticky, thick liquid called mucus that protects the stomach. The lamina propria contains connective tissue, tiny lymph spaces, and glands. Lymph is a clear fluid that gives cells water and food and contains germ-fighting blood cells. The muscularis mucosae is a thin strip of muscle that separates the mucosa from the submucosa.

Figure 1 The digestive tract

The stomach is one of four organs that make up the gastrointestinal tract. Food passes through the esophagus into the stomach. After being broken down into a liquid, food enters the small intestine. The large intestine prepares unused food to be moved out of the body.



The second layer of the stomach wall is called the submucosa. It consists of connective tissue and blood vessels and nerve cells. It also contains larger lymph spaces.

The third layer is called the muscularis propria. It is mostly made of muscle fibers. These muscles help move food through the stomach.

The fourth layer is the outermost part of the stomach. The serosa, also called the visceral peritoneum, is a membrane that lines the stomach wall. It has a thin layer of connective tissue, called the subserosa, which is covered by a single row of cells that make lubricating fluid. This fluid allows the stomach to move smoothly against other organs.

Types of stomach cancer

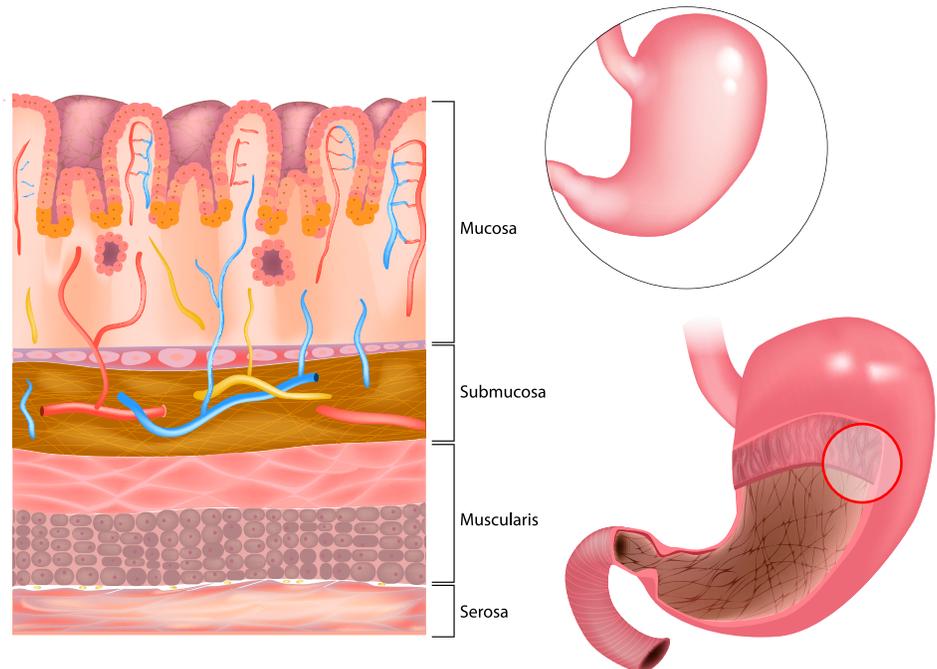
Most stomach cancers start in the cells that line the inside of the stomach and make mucus. These are called adenocarcinomas. Almost all stomach cancers are adenocarcinomas. **Adenocarcinomas of the stomach are the focus of this book.**

There are two major types of stomach adenocarcinomas. Cells of the intestinal type stick together and form tube- and gland-shaped structures. Cells of the diffuse type don't stick together and spread over a wide area that can be easily seen on the surface.

Many tumors that start in the stomach are treated as stomach cancers. However, tumors that start in the very top part (2 cm or about one inch) of the stomach and cross over into the area between the esophagus and stomach are treated as esophageal cancers. Read the [NCCN Guidelines for Patients:](#)

Figure 2
The stomach wall

The stomach wall is made of four layers. The inside layer that comes into contact with food is the mucosa. This is where stomach cancer usually starts.



[Esophageal Cancer](#) to learn the treatment options for these cancers.

Diagnosis and treatment planning

Physical exam and medical history

Performing a physical exam and reviewing your medical history are two important first steps in the initial testing ("workup") for suspected stomach cancer.

Your medical history includes all health events and medicines you've taken in your life. It also includes symptoms that may be related to stomach cancer. A medical history helps your doctors know if you are healthy enough for surgery and chemotherapy.

Genetic risk assessment

Some people are more likely to develop stomach cancer than others. Anything that increases your chances of getting stomach cancer is called a risk factor. Risk factors can be activities that people do, things in the environment, or personal traits. A medical history helps your doctor assess if the stomach cancer is caused by abnormal changes in genes that are passed down from parents to children (inherited). This is called a *genetic risk assessment*.

As part of the genetic risk assessment, your doctor will ask about the medical history of your blood relatives. It's important to know which diseases your family members have had, and how old they were when diagnosed. Your doctor may ask about the health of your children and grandchildren, your siblings, your parents and their siblings, and your grandparents.

No one in your family may have had stomach or a related cancer. You still may have an inherited syndrome that increased your chances of getting stomach cancer. A syndrome is a group of signs

or symptoms that occur together and suggest the presence of or risk for a disease. The inherited syndromes most closely related to stomach cancer are listed next.

- Hereditary diffuse gastric cancer (HDGC)
- Lynch syndrome
- Juvenile polyposis syndrome
- Peutz-Jeghers syndrome
- Classic or attenuated familial adenomatous polyposis (FAP/aFAP).

If your doctor thinks you have hereditary stomach cancer, you should be referred to a genetic counselor. A genetic counselor can talk with you about getting tested for syndromes related to stomach cancer. To be tested, you must provide a sample of blood. Using the sample, a pathologist can test your genes for abnormal changes that cause these syndromes.

The hereditary syndromes listed below may also be associated with an increased risk of developing stomach cancer. However, research does not support testing for stomach cancer in people with these syndromes.

- Ataxia-telangiectasia
- Bloom syndrome
- Hereditary breast and ovarian cancer syndrome
- Li-Fraumeni syndrome
- Xeroderma pigmentosum
- Cowden syndrome

Routine blood tests

Common blood tests included in the workup for most cancers are described next.

Complete blood count (CBC)

A CBC gives important information about the parts of blood. One example is the number of white blood cells, red blood cells, and platelets. Your blood counts may be low because the cancer has spread into your bones, the cancer is causing bleeding, or because of another health problem.

Comprehensive chemistry profile

Chemicals in your blood come from your liver, bone, and other organs. A comprehensive chemistry profile assesses if the chemicals in your blood are too low or high. Abnormal levels can be caused by spread of cancer or by other diseases.

Imaging tests

Imaging tests are used to see inside your body. The pictures can show the tumor size, shape, and location. They can also show if the cancer has spread beyond your stomach. Different types of imaging tests are used to look for stomach cancer, plan treatment, and check treatment results.

Computed tomography (CT)

CT is a common imaging test that uses x-rays to create pictures of the inside of your body. You should have a CT scan of your chest, abdomen, and pelvis as part of the workup for stomach cancer.

A contrast dye should be used to make the pictures clearer. The dye will be injected into your vein and mixed with a liquid you drink. The dye may cause you to feel flushed or get hives. Rarely, serious allergic reactions occur. Tell your doctor and the technicians if you have previously had a bad reaction to contrast dye.

PET/CT scan

Sometimes CT is combined with another imaging test called positron emission tomography (PET). When used together, it is called a PET/CT scan. PET scans identify areas with higher rates in the body compared to normal cells.

Upper endoscopy

An upper endoscopy (also known as an esophagogastroduodenoscopy [EGD]) allows your doctor to see inside your esophagus and stomach. A long, thin tool called an endoscope is used. At the tip of the endoscope is a light and camera. The endoscope is guided down your throat and into your esophagus and stomach. **See Figure 3.**

Your doctor will record where the tumor is in your stomach or esophagus. If the tumor is near the esophagus, the distance from the esophagogastric junction may also be recorded.

Your doctor may also take a sample of the tumor. This is called a biopsy. Also, samples from tissue that is at high risk for cancer and tissue with possible cancer may be collected. Biopsy samples will be sent to a pathologist for testing. After the endoscopy, you may feel some swelling and sound hoarse.

Endoscopic ultrasound

Endoscopic ultrasound uses both imaging and an endoscope to see how deep the tumor has grown into the stomach wall. Signs of cancer within lymph nodes and other nearby organs can also be detected.

You are most likely to have an endoscopic ultrasound if your doctor suspects that the cancer hasn't grown far (early-stage disease), or to determine whether the cancer is early stage or locally advanced.

If it looks like the cancer has spread, the endoscope can be used to do a type of biopsy called a fine-needle aspiration (FNA). A needle will be inserted through the wall of your stomach or esophagus and into nearby tissue to get samples. Samples may be taken from

lymph nodes or organs next to your stomach, such as your liver.

Endoscopic resection

Instead of a diagnostic tool, endoscopic resection is more often used as treatment of tumors that haven't grown deep into the stomach wall. Your doctor may be able to remove tumor(s) and high-risk tissue with tools inserted through an endoscope. **Endoscopic resection plays a very important role in determining the stage of early stomach cancers.**

Laparoscopy with cytology

This test is a type of surgery that allows your doctor to look for diseases inside your belly area (abdomen). Laparoscopy may detect distant metastases in the tissue lining of the abdomen (peritoneum) or liver. Your doctor may consider laparoscopy for stomach cancer that:

- Has spread beyond the first layer of the stomach wall but not to areas far from the stomach, and
- May be treated with chemoradiation or surgery.

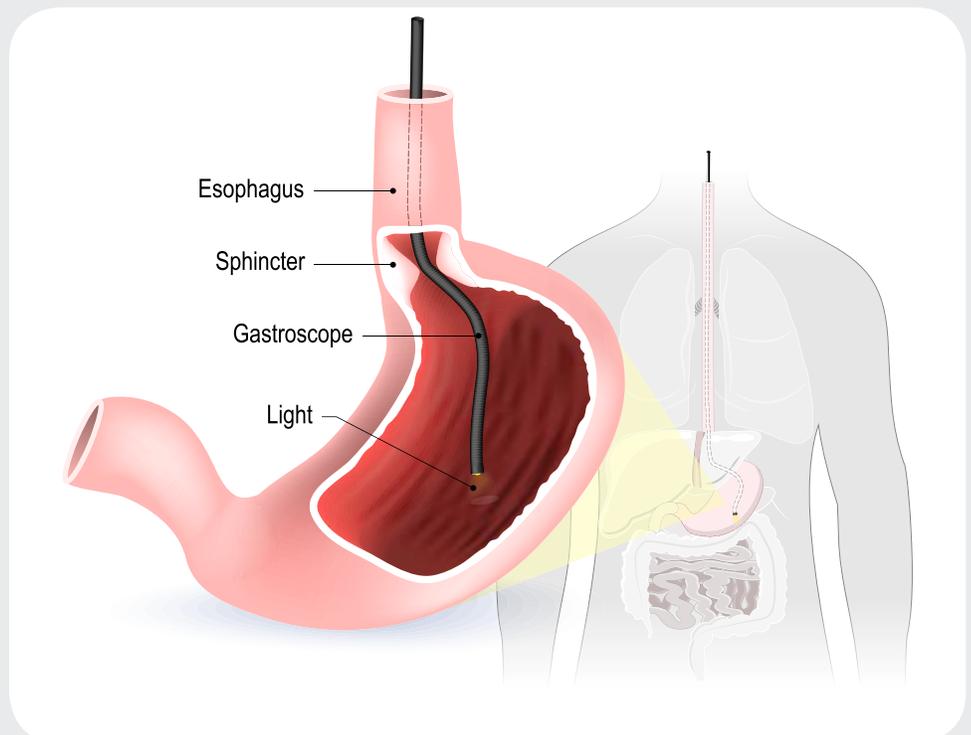
Laparoscopy is done under general anesthesia. It involves the use of a tool called a laparoscope, which is much like an endoscope. The tube-like part of the laparoscope will be inserted through a tiny cut in your abdomen. Your doctor will be able to look for signs of cancer and obtain fluid for cancer testing (peritoneal washings).

Biopsy of metastases

If cancer may have spread far from the stomach, a biopsy of the distant site may be needed to confirm the presence of cancer. The type of biopsy used depends on the location of the suspected metastases and other factors.

Figure 3 Upper endoscopy

Upper endoscopy allows your doctor to see the inner wall of your stomach and esophagus. If ultrasound is used, your doctor will be able to see the deeper wall layers and nearby organs.



Biomarker testing

An additional type of test recommended by NCCN experts for some people with gastric cancer is biomarker testing. Biomarkers can be substances, like molecules or proteins, that are made by your body because you have cancer. Biomarkers can also be processes, such as the way your DNA “acts” that makes it unique. The most important biomarkers used in the management of stomach cancer are described next.

HER2

Human epidermal growth factor receptor 2 (HER2) is a protein found on the surface of all cells. Some cancer cells make too much HER2, which can cause the cancer to grow and spread more quickly than it normally would. The medical terms for this are *HER2 positivity* or *HER2 overexpression*.

If your tumor makes too much HER2, you may be eligible for treatment with a targeted therapy medicine called trastuzumab (Herceptin®).

PD-L1

Your immune system has important white blood cells called T cells. T cells’ main job is to attack harmful things in your body, like bacteria, viruses, and cancer cells. They do this with the help of a protein on their surface called PD-1.

Cancer cells have a different protein on their surface called PD-L1. When the PD-1 receptor and PD-L1 meet, it is called an immune checkpoint. The T cell is “told” to leave the cancer cell alone instead of attacking it. Immune checkpoint inhibitors stop these two proteins from meeting. This means that the T cells will do their job and attack the cancer cells.

If your tumor or immune cells have the PD-L1 biomarker, you may be eligible for treatment with an immune checkpoint inhibitor called pembrolizumab (KEYTRUDA®).

Microsatellite instability-high (MSI-H) or mismatch repair deficiency (dMMR)

Some people have a problem with their genes that makes them unable to fix damaged DNA. In normal cells, a process called mismatch repair (MMR) fixes errors that happen when the DNA divides and makes a copy of itself. If a cell’s MMR system isn’t working right, errors build up and cause the DNA to become unstable. This is called microsatellite instability (MSI).

There are two kinds of laboratory tests for detecting this instability. Depending on which method is used, the result will either be MSI-H (microsatellite instability-high) or dMMR (mismatch repair deficiency). Both results mean the same thing.

If your tumor is MSI-H or dMMR, you may be eligible for treatment with an immune checkpoint inhibitor called pembrolizumab (KEYTRUDA®).

Next steps

Your doctors will use the results of all the tests just described in order to determine the clinical (pre-surgery) stage of the cancer. The staging process is described in the next chapter, *Stomach cancer staging*.

People with stomach cancer can be grouped into three main categories, depending on how far the cancer has spread. The treatment goals and management of these groups are different.

- **Early stomach cancer.** Early stomach cancers have not grown beyond the first layer of the stomach wall.
- **Locoregional stomach cancer.** These cancers have invaded the second layer of the stomach wall or spread to the lymph nodes next to the stomach, but have not spread to areas far from the stomach.
- **Metastatic stomach cancer.** Cancer has spread to lymph nodes and organs far from

the stomach. These cancers are generally not curable. The main goal of care for metastatic stomach cancer is to help you live as normally and as comfortably as possible, for as long as possible.

Other care before treatment

Nutritional assessment

You should meet with a nutritionist before starting treatment. The nutritionist can assess the impact of the cancer on your nutrition. Stomach cancer can make you lose your appetite. You may also feel full after eating very little. These changes may have caused you to lose too much weight.

It is important that you receive adequate and sustained nutrition before you start treatment. Surgery and other cancer treatments may be too dangerous if you are weak from a lack of nutrition. You may be advised to receive your food through a feeding tube.

Help quitting smoking

If you are a smoker, it is very important to quit. Smoking can limit how well cancer treatment works. Smoking also greatly increases your chances of having side effects after surgery.

Nicotine addiction is one of the hardest addictions to stop. The stress of having stomach cancer may make it even harder to quit. If you smoke, ask your doctor about counseling and medications to help you quit.

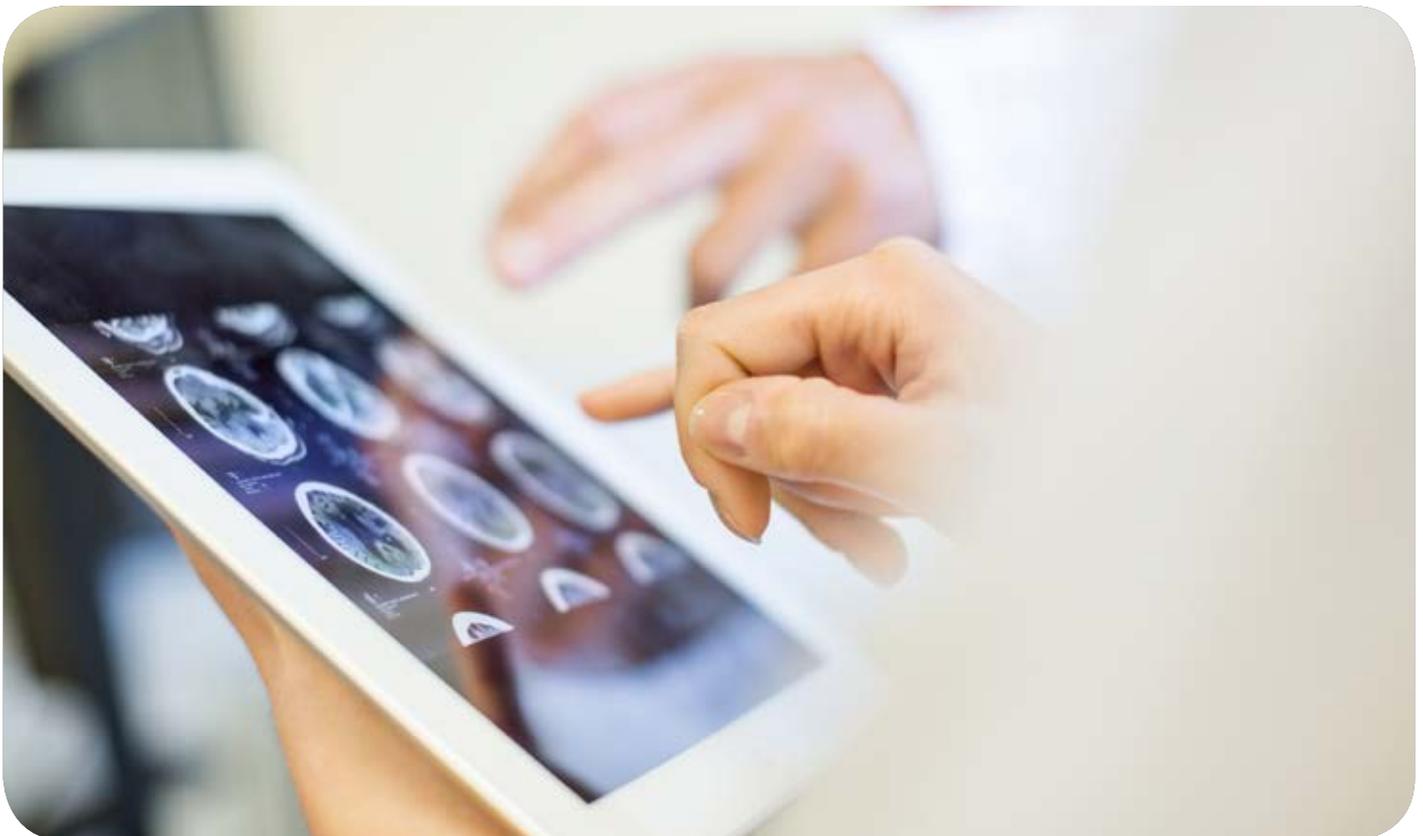
Review

- The wall of the stomach has four layers. Cancer starts in the innermost layer and grows into the stomach wall.
- Most stomach cancers start in cells that line the inside of the stomach wall and make mucus. These stomach cancers are called adenocarcinomas.
- Cancer cells form a tumor since they don't grow and die as normal cells do.
- Cancer cells can spread to other body parts through lymphatic spaces or blood vessels.
- Getting good nutrition is important before starting treatment.
- If you smoke tobacco, it is important to quit so that you get the best treatment results.

2

Stomach cancer staging

- 15 About cancer staging
- 15 The TNM system
- 16 The stages of stomach cancer
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Cancer staging is a rating of how far the cancer has grown and spread. The rating is based on test results. Doctors plan additional tests and treatment based on the cancer stage. This chapter explains the system used for staging stomach cancer.

About cancer staging

Stomach and other cancers are often staged twice, both initially and with information gained after surgery to remove the stomach.

Clinical (pre-surgery) stage

The clinical (before surgery) stage is based on the results of initial testing you had to diagnose stomach cancer. The clinical stage provides a "best guess" of how far the cancer has spread. It is a best guess because surgery is needed in order to know exactly how much cancer is in the body.

Pathologic (post-surgery) stage

The pathologic (after surgery) stage is a rating of the extent of cancer based on more definitive information gained after surgery to remove the stomach and nearby lymph nodes. **The pathologic stage is very important because it gives a much more accurate picture of how far the cancer has spread.** The pathologic (post-surgery) stage is also used to determine your treatment options after surgery.

The TNM system

The American Joint Committee on Cancer (AJCC) system is used to stage stomach cancer. In the AJCC system, the letters **T**, **N**, and **M** describe a different location of cancer growth. Your doctors will assign a score to each letter. The scores are then combined to assign the cancer a stage. The cancer stage is used to determine your prognosis and to decide what treatments will be used. A prognosis is a prediction of the pattern and outcome of a disease.

T = Tumor

Stomach cancers grow through the wall of the stomach and then into nearby structures. The T score describes how far the tumor has grown through the stomach wall. T scores for stomach cancer include:

- **Tis** means that abnormal cells have formed on the innermost lining of the stomach (the epithelium).
- **T1a** tumors have invaded the first layer of the stomach wall (the mucosa).
- **T1b** tumors have invaded the second layer of the stomach wall (the submucosa).
- **T2** tumors have invaded the third layer of the stomach wall (the muscularis propria).
- **T3** tumors have invaded the connective tissue between the third and outer layer of the stomach wall.
- **T4a** tumors have invaded the outer layer of the stomach wall (the serosa).
- **T4b** tumors have grown all the way through the stomach wall and into nearby areas of the body, such as the diaphragm, liver, spleen, pancreas, adrenal gland, kidney, colon, small intestine, and abdominal wall.

N = Node

Lymph drains from stomach tissue into spaces that transport lymph to the bloodstream. As lymph travels, it passes through small structures called lymph nodes. Lymph nodes remove germs from lymph. Lymph nodes and vessels are found throughout the body. The N category reflects the number of lymph nodes with stomach cancer.

- **NX:** The lymph nodes can't be assessed.
- **N0:** There is no cancer in nearby lymph nodes.
- **N1:** 1 or 2 nearby nodes have cancer.
- **N2:** 3 to 6 nearby nodes have cancer.
- **N3a:** 7 to 15 nearby lymph nodes have cancer.
- **N3b:** 16 or more nearby lymph nodes have cancer.

M = Metastasis

The M category tells you if there are metastases to sites not in direct contact with the stomach. Such sites include distant lymph nodes.

- **M0:** There is no growth to distant sites.
- **M1:** The cancer has spread to distant sites, like the liver or the lungs.

The stages of stomach cancer

The pathologic (post-surgery) stages of stomach cancer are described next. The TNM scores that correspond to each stage are provided in parentheses after the stage description.

Stage 0

Abnormal cells have started growing on the innermost lining of the stomach (the epithelium). These cells need to be treated because they could become invasive stomach cancer. Other names for this stage include *carcinoma in situ* and *high-grade dysplasia*. (Tis, N0, M0)

Stage 1A

A tumor has formed and has invaded the first or second layer of the stomach wall. There is no cancer in nearby lymph nodes. (T1, N0, M0)

Stage 1B

There are two possible scenarios for this stage:

- The tumor has invaded the first or second layer of the stomach wall, and there is cancer in 1 or 2 nearby lymph nodes. (T1, N1, M0)
- The tumor has invaded the third layer of the stomach wall. There is no cancer in nearby lymph nodes. (T2, N0, M0)

Stage 2A

There are three possible scenarios for this stage:

- The tumor has invaded the first or second layer of the stomach wall, and there is cancer in 3 to 6 nearby lymph nodes. (T1, N2, M0)
- The tumor has invaded the third layer of the stomach wall, and there is cancer in 1 or 2 nearby lymph nodes. (T2, N1, M0)

- The tumor has invaded the connective tissue between the third and outer layer of the stomach wall. There is no cancer in nearby lymph nodes. (T3, N0, M0)

Stage 2B

There are four possible scenarios for this stage:

- The tumor has invaded the first or second layer of the stomach wall. There is cancer in 7 to 15 nearby lymph nodes. (T1, N3a, M0)
- The tumor has invaded the third layer of the stomach wall and there is cancer in 3 to 6 nearby lymph nodes. (T2, N2, M0)
- The tumor has invaded the connective tissue between the third and outer layer of the stomach wall and there is cancer in 1 or 2 nearby lymph nodes. (T3, N1, M0)

- The tumor has invaded the outer layer of the stomach wall (the serosa). There is no cancer in nearby lymph nodes. (T4a, N0, M0)

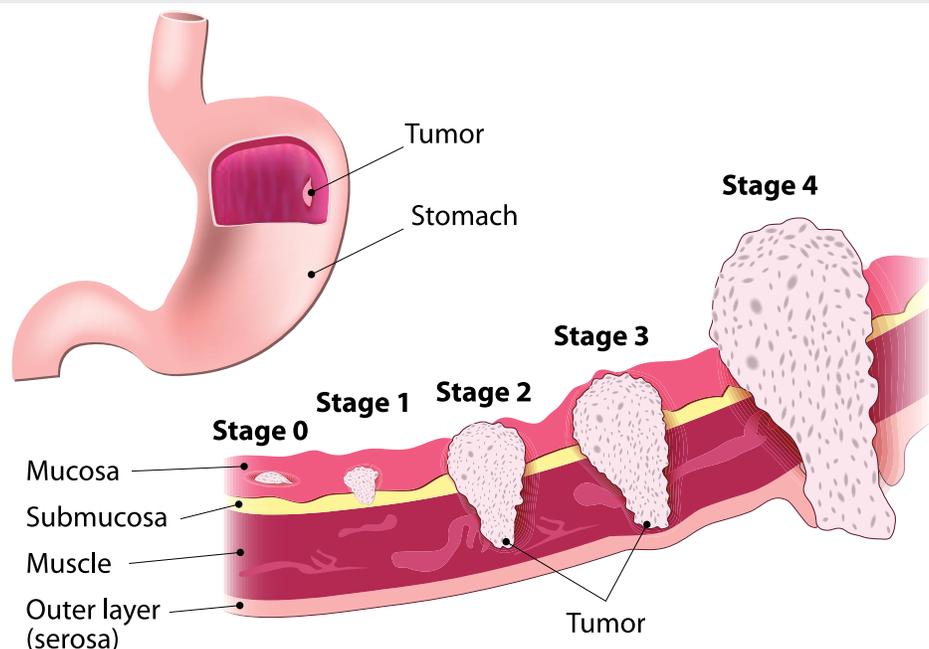
Stage 3A

There are four possible scenarios for this stage:

- The tumor has invaded the third layer of the stomach wall. There is cancer in 7 to 15 nearby lymph nodes. (T2, N3a, M0)
- The tumor has invaded the connective tissue between the third and outer layer of the stomach wall. There is cancer in 3 to 6 nearby lymph nodes. (T3, N2, M0)
- The tumor has invaded the outer layer of the stomach wall (the serosa). There is cancer in 1 to 6 nearby lymph nodes. (T4a, N1 or N2, M0)

Figure 4
The stages of stomach cancer

After forming in the mucosa, stomach tumors grow through the rest of the stomach wall and into nearby parts of the body.



- The tumor has grown through the stomach wall and into other nearby parts of the body. There is no cancer in nearby lymph nodes. (T4b, N0, M0)

Stage 3B

There are five possible scenarios for this stage:

- The tumor has invaded the first or second layer of the stomach wall. There is cancer in 16 or more nearby lymph nodes. (T1, N3b, M0)
- The cancer has invaded the third layer of the stomach wall. There is cancer in 16 or more nearby lymph nodes. (T2, N3b, M0)
- The cancer has invaded the connective tissue between the third and outer layer of the stomach wall. There is cancer in 7 to 15 nearby lymph nodes. (T3, N3b, M0)
- The tumor has invaded the outer layer of the stomach wall (the serosa). There is cancer in 7 to 15 nearby lymph nodes. (T4a, N3a, M0)
- The tumor has grown through the stomach wall and into other nearby parts of the body. There is cancer in 1 to 6 nearby lymph nodes. (T4b, N1 or N2, M0)

Stage 3C

There are three possible scenarios for this stage:

- The tumor has invaded the connective tissue between the third and outer layer of the stomach wall. There is cancer in 16 or more nearby lymph nodes. (T3, N3b, M0)
- The tumor has invaded the outer layer of the stomach wall (the serosa). There is cancer in 16 or more nearby lymph nodes. (T4a, N3b, M0)

- The tumor has grown through the stomach wall and into other nearby parts of the body. There is cancer in at least 7 and possibly more than 16 nearby lymph nodes. (T4b, N3a or N3b, M0)

Stage 4

Cancer has spread to areas of the body far from the stomach (metastasized). The tumor may be any size and in any number of lymph nodes. (any T, any N, M1)

Review

- Stomach cancer is grouped into stages to help plan treatment.
- Doctors rate the extent of stomach cancer in the body using the tumor, node, metastasis (TNM) system.
- The **clinical stage** of stomach cancer is based on the results of testing before surgery. The clinical stage can only provide a "best guess" of how far the cancer has spread because surgery is needed in order to know exactly how much cancer is in the body.
- The **pathologic stage** of stomach cancer is based on the results of surgery. The pathologic stage is very important because it gives a much more accurate picture of how far the cancer has spread.

3

Overview of cancer treatments

20 Endoscopic treatment

21 Surgery

23 Radiation therapy

24 Chemotherapy

25 Targeted therapy

26 Clinical trials

26 Review



This chapter briefly describes the main treatment types for stomach cancer. Knowing what a treatment is will help you understand your treatment options. There is more than one treatment for stomach cancer. Not every person will receive every treatment described in this chapter.

Endoscopic treatment

Endoscopic resection is an option for removing early stomach cancers that haven't grown beyond the first layer of the stomach wall. This treatment removes small tumors using tools inserted through an endoscope. **See Figure 5.**

There are two ways to resect, or remove, small stomach tumors. In both methods, liquid is first injected under the tumor. The liquid acts as a cushion and “lifts” up the tumor. Then, the tumor is removed in one of two ways.

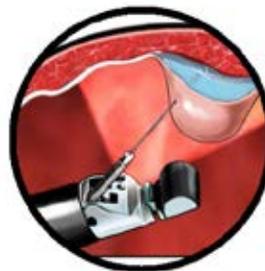
- **Endoscopic mucosal resection (EMR).** The cancer cells are removed with a lasso-shaped tool called a snare. This method is best for removing tumors that haven't reached deeper layers of the esophageal wall.
- **Endoscopic submucosal dissection (ESD).** The doctor uses a knife to break up the healthy tissue under the tumor. This allows the whole tumor to be removed in one piece, which helps stop it from coming back. This method is best for removing tumors that have grown deeper into the stomach wall.

Figure 5 Endoscopic resection

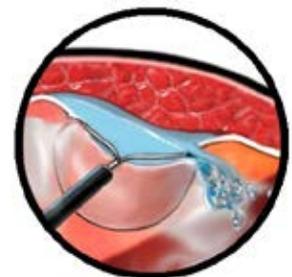
Stomach tumors that have not invaded deep into the stomach wall may be removed with endoscopic resection. This treatment removes tumors with tools inserted through an endoscope.



An endoscope is guided into the stomach



Fluid is injected under the tumor



A cutting tool removes the tumor

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Surgery

Surgery is a treatment option for many stomach cancers. The goal of surgery for stomach cancer is to remove the entire tumor and some normal-looking tissue surrounding it. The normal-looking tissue is called the *surgical margin*.

Gastrectomy

The type of surgery used to treat stomach cancer is called a gastrectomy. A gastrectomy removes some or all of the stomach, depending on the extent of the cancer.

- A *total gastrectomy* removes your whole stomach. **See Figure 6.**
- A *subtotal gastrectomy* (also called partial gastrectomy) removes part of your stomach.

- A *distal gastrectomy* is a subtotal gastrectomy of the lower half of your stomach.
- A *proximal gastrectomy* is a subtotal gastrectomy of the upper half of your stomach.

Open gastrectomy

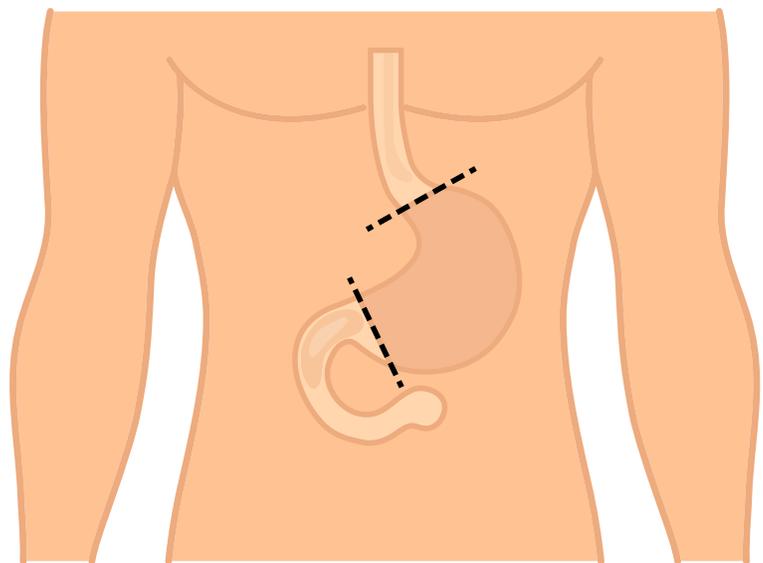
Most gastrectomies are done using an "open" technique. In this common method, the surgeon makes a large cut into the abdomen and "opens" it in order to reach and remove the stomach. The esophagus is then surgically joined to the small intestine. In a subtotal or distal gastrectomy, the remaining stomach is attached to the small intestine or esophagus.

Laparoscopic gastrectomy

There is also a less invasive method of removing cancer from the stomach, called *laparoscopic gastrectomy*. Instead of one large cut into the abdomen, laparoscopic gastrectomy uses several

Figure 6 Gastrectomy

A total gastrectomy removes all of your stomach. Any nearby structures that have been invaded by the tumor will be removed, too. During surgery, some lymph nodes will be removed and tested for cancer.



smaller cuts. Small tools are inserted into the cuts to remove the cancerous tissue with the help of a video camera.

Laparoscopic gastrectomy is appropriate for some, but not all, stomach cancers. You and your surgeon should discuss whether your cancer can be removed laparoscopically.

Lymph node dissection

During the gastrectomy, some lymph nodes near your stomach will also be removed and tested for cancer. This is called a *lymph node dissection*.

There are three main types of lymph node dissection for stomach cancer. They differ based on how many lymph nodes are removed.

- A D0 resection means that lymph nodes near the stomach were not removed.
- A D1 dissection removes the lymph nodes closest to the stomach.
- A D2 dissection removes the lymph nodes closest to the stomach, as well as lymph nodes next to nearby arteries and your spleen.

NCCN experts recommend that 15 or more lymph nodes should be removed during a gastrectomy.

Radiation therapy

Radiation therapy uses high-energy rays to treat cancer. The rays kill cancer cells or stop new cancer cells from being made. External beam radiation therapy (EBRT) is the most common type of radiation used to treat stomach cancer. This method delivers radiation from outside your body using a large machine. The radiation passes through your skin and other tissue to reach the tumor. **See Figure 7.**

Radiation therapy to treat stomach cancer is given daily during a 4-6 week period. It is given in a series of treatments to allow healthy cells to heal between treatments. Radiation therapy is usually combined with chemotherapy given over the same time period.

Simulation session

You will first have a planning session called a simulation. You will be placed in the treatment position and a CT scan will be done. The CT scan images will be used to make your radiation plan. The plan will describe the best radiation dose for you, as well as the number of sessions you will need.

Receiving radiation

During treatment, you will lie on a table in the same position as done for simulation. Devices may be used to keep you from moving so that the radiation targets the tumor. You will be alone while the technician operates the machine from a nearby room. He or she will be able to see, hear, and speak with you at all times.

Side effects of radiation

Skin that was exposed to radiation may look and feel as if it has been sunburned. It will likely become red and may also become dry, sore, and feel painful when touched.

Radiation therapy to a stomach tumor may also cause nausea, vomiting, and diarrhea. Other reactions may include pain in the treated area, extreme tiredness despite sleep (fatigue), and loss of appetite.

Ask your treatment team for a complete list of common and rare side effects. If a side effect bothers you, there may be ways to help you feel better.

Figure 7 External beam radiation therapy

Radiation therapy is often delivered from a large machine. The rays pass through skin and tissue to reach the tumor. Radiation therapy to treat stomach cancer is typically given daily during a 4-6 week period.



Chemotherapy

Chemotherapy (“chemo” for short) is treatment with drugs to kill cancer cells. Most chemotherapy drugs for stomach cancer are liquids that are slowly injected into a vein. The drugs travel in your bloodstream to treat cancer throughout your body. The term “systemic” is used to refer to a cancer treatment that affects the whole body.

Sometimes, only one drug is used. Other times, more than one drug is used because drugs differ in the way they work. A combination regimen is the use of two or more chemotherapy drugs.

Chemotherapy is given in cycles of treatment days followed by days of rest. This allows the body to recover before the next cycle. Cycles vary in length depending on which drugs are used.

Side effects of chemotherapy

The side effects of chemotherapy vary from person to person and depend on the drug type, amount taken (dose), and the length of treatment. Common side effects include not feeling hungry, nausea, vomiting, diarrhea, hair loss, and mouth sores. Your nails may also change in color, strength, dryness, and smoothness.

Some chemotherapy drugs cause damage to the sensory nerves. This is called sensory neuropathy. Symptoms include numbness, tingling, and pain in fingers and toes. You may also have sensitivity to cold and pain to light touch. Talk with your doctor about ways to prevent or reduce the symptoms of sensory neuropathy.

Ask your treatment team for a complete list of common and rare side effects. If a side effect bothers you, there may be ways to help you feel better.

Figure 8 Chemotherapy

Chemotherapy is the use of medicines to kill cancer cells throughout the body. The term “systemic” refers to treatment that affects the whole body. Chemotherapy can harm both normal cells and cancer cells.



Targeted therapy

Targeted therapy is a cancer treatment that can target and attack specific types of cancer cells. Targeted therapy does not harm normal cells as much as chemotherapy, so the side effects tend to be less severe.

Treatment with a targeted therapy is often used for people with specific gene mutations. If you don't have the mutation that the medicine "targets," treatment is unlikely to help you. For example, trastuzumab (Herceptin[®]) targets stomach tumors that make too much of the HER2 protein. The medical name for this is *HER2 overexpression*.

The three targeted therapies currently approved by the U.S. Food & Drug Administration (FDA) for use in stomach cancer are:

- Trastuzumab (Herceptin[®])
- Ramucirumab (CYRAMZA[®])
- Pembrolizumab (KEYTRUDA[®])

Guide 1 lists the targets of each of these medicines.

Guide 1. Targeted therapies for stomach cancer

Brand name	Generic name	What does this medicine target?
CYRAMZA [®]	Ramucirumab	Vascular endothelial growth factor receptor 2 (VEGFR-2)
Herceptin [®]	Trastuzumab	HER2-positive tumors
KEYTRUDA [®]	Pembrolizumab	<ul style="list-style-type: none"> • Microsatellite instability-high (MSI-H) or mismatch repair deficient (dMMR) tumors • Tumors with the PD-L1 biomarker

Am I eligible for treatment with a targeted therapy?

If your cancer has a mutation that is targeted by one of these medicines, it doesn't necessarily mean that you can (or should) be treated with it. In the management of stomach cancer, NCCN experts recommend that treatment with a targeted therapy be considered for people with:

- Locoregional stomach cancer that cannot be removed with surgery, or
- Stomach cancer that has returned after treatment (recurrent cancer), or
- Metastatic stomach cancer, if you are able to do most daily activities.

Clinical trials

New tests and treatments aren't offered to the public until they are deemed safe for testing and potentially effective. They first need to be studied in a way that is regulated by the FDA and other governmental agencies.

A clinical trial is a type of research that studies the safety and effectiveness of tests and treatments. They are done at all stages of a disease like stomach cancer. When found to be safe and effective, they may become tomorrow's standard of care.

Because of clinical trials, the tests and treatments in this book are now widely used to help people with stomach cancer. All new drugs are tested in a clinical trial before being approved for general use. Most patients will be given standard treatment first. Clinical trials are offered when standard treatment fails, or if you cannot tolerate the treatment.

Joining a clinical trial can have both benefits and risks. You will need to weigh the potential benefits and downsides to decide what is right for you. To join a clinical trial, you must meet the conditions of the study. Patients in a clinical trial are often alike in terms of their cancer and general health. This is to ensure that any progress is because of the treatment and not because of differences between patients. To join, you'll need to review and sign a paper called an informed consent form. This form describes the study in detail, including the risks and benefits.

Ask your treatment team if there is an open clinical trial that you can join. There may be clinical trials where you're getting treatment or at other treatment centers nearby. You can also find clinical trials through the websites listed in the chapter, *Making treatment decisions*.

Review

- ▶ Endoscopic resection removes early tumors with small tools that are guided down the throat and into the stomach.
- ▶ A gastrectomy removes some or all of the stomach along with nearby lymph nodes through an incision made in the belly area. This surgery may be done through one large cut (open method) or a few small cuts (minimally invasive method).
- ▶ Radiation therapy uses high-energy rays to kill cancer cells or stop new cancer cells from being made.
- ▶ Chemotherapy stops cancer cells from completing their life cycle so they can't increase in number.
- ▶ Targeted therapy is a cancer treatment that can target and attack specific types of cancer cells. It is often used for people with specific gene mutations.
- ▶ Clinical trials give people access to new tests and treatments that otherwise can't usually be received. These new tests and treatments may, in time, be approved by the FDA.

4

Treatment guide

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- 38 Metastatic stomach cancer
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This chapter is a guide to the treatment options for people with stomach cancer. Treatment options are grouped by the extent of the cancer. This information is taken from treatment guidelines written by NCCN experts for doctors who treat stomach cancer. Your doctors may suggest other treatments than those listed here based on your health and personal wishes.

Early stomach cancer

To describe how far a tumor has grown into the stomach wall, an uppercase letter **T** followed by a number from 1 to 4 (and sometimes letters) is used. The higher the number, the deeper the tumor has grown into the stomach wall. This is called the *tumor stage*. The tumor stage is not the same as the overall stage, but it plays a key role in determining the overall stage.

The tumor stages for early stomach cancer are:

- **Tis tumors.** Also called *carcinoma in situ*, Tis refers to fast-growing abnormal cells on the innermost lining of the stomach (the epithelium). These tumors need to be treated because they could become invasive stomach cancer.
- **T1a tumors.** These early-stage tumors have invaded the first layer of the stomach wall (the mucosa).

Treatment of early stomach cancer depends on:

- Whether you are healthy enough for surgery, and
- Whether you want to have surgery.

See [Guide 2](#) for the treatment options for early stomach cancer. Endoscopic resection is an option for both Tis and T1a tumors. If you are able and willing to have surgery, gastrectomy with lymph node dissection is also an option.

Will I need more treatment after endoscopic resection or surgery?

Maybe. The next pages explain what to expect after initial treatment of early stomach cancer.

Guide 2. Initial treatment of early stomach cancer

Surgery status	What are my options?
You are unable or unwilling to have surgery	Endoscopic resection
You are able and willing to have surgery	Option 1: Endoscopic resection Option 2: Surgery and lymph node dissection

After endoscopic resection

You may not need more treatment after endoscopic resection. Generally, endoscopic resection is considered successful if:

- The tumor is 2 centimeters or less in diameter
- The cancer cells look similar to normal cells under a microscope (well- or moderately well-differentiated)
- The tumor hasn't invaded the second layer of the stomach wall
- There are no cancer cells in the blood vessels or lymphatic spaces outside of the tumor (called *lymphovascular invasion*)
- There are no cancer cells around the edges of the removed tissue (the surgical margin).

If endoscopic resection is successful, you can begin monitoring for the return of cancer.

If the cancer turns out to be higher risk based on the findings of endoscopic resection, you may need surgery (gastrectomy) and lymph node removal.

After surgery

The results of surgery are used to decide if more treatment is needed. If your surgeon was able to remove all the cancer and no cancer cells were found in the removed tissue surrounding the tumor, no more treatment is needed. The next step is to start follow-up care and monitoring for the return of cancer.

Follow-up care

When there are no signs of cancer after treatment, follow-up care and monitoring for the return of cancer begin. The follow-up care you should receive depends on whether you were treated with endoscopic resection or surgery. [See Guide 3.](#)

Guide 3. Surveillance after treatment for early stomach cancer

Tis and T1a tumors treated with endoscopic resection

Follow-up care	How often?
Physical exam and updated medical history	Every 3–6 months for 1–2 years, every 6–12 months for 3–5 years, and annually thereafter
CBC and chemistry profile	As needed according to your doctor
Upper GI endoscopy	Tis tumors: Every 6 months for 1 year, then annually for 3 years T1a tumors: Every 6 months for 1 year, then annually for up to 5 years. Thereafter, as needed according to your doctor.
Imaging of your chest, abdomen, and pelvis using computed tomography (CT)	As needed according to your doctor

T1a tumors treated with surgery (no cancer in lymph nodes)

Follow-up care	How often?
Physical exam and updated medical history	Every 3–6 months for 1–2 years, every 6–12 months for 3–5 years, and annually thereafter
CBC and chemistry profile	As needed according to your doctor
Upper GI endoscopy	As needed according to your doctor
Imaging of your chest, abdomen, and pelvis using computed tomography (CT)	As needed according to your doctor
Monitoring for nutritional health including vitamin B12 and iron levels	Ongoing

Locoregional stomach cancer

If a stomach tumor grows beyond the first layer of the stomach wall (the mucosa), it is called *locoregional cancer*. There may be cancer in nearby lymph nodes, but not in areas far from the stomach.

Surgery may be a treatment option for these cancers. Your doctors will assess if you are able to undergo surgery by testing your lungs, heart, and nutritional intake.

You are healthy enough for major surgery

If you are medically able to tolerate major surgery, whether you can have surgery also depends on the location and extent of the cancer.

The tumor may be able to be removed

If you are healthy enough for major surgery and your doctor thinks that the cancer can be removed using surgery, your treatment options depend on the clinical (pre-surgery) stage.

If the tumor is thought to have invaded the second layer of the stomach wall (called the submucosa), it is a T1b tumor in the TNM staging system. **Surgery is the main treatment option for T1b tumors.**

If the tumor has grown beyond the second layer of the stomach wall, it is a T2, T3, or T4 tumor. There is more than one treatment option for these tumors:

- Surgery alone
- Surgery and chemotherapy. Chemotherapy is given before and after the surgery. This is called *perioperative chemotherapy*. **This treatment option is preferred by NCCN experts.** The recommended chemotherapy regimens for perioperative chemotherapy are listed in [Guide 4](#).

- Chemotherapy and radiation (chemoradiation), followed by surgery. This is called *preoperative chemoradiation*. The recommended chemotherapy regimens for preoperative chemoradiation are shown in [Guide 5](#).

If you have perioperative chemotherapy or preoperative radiation, you should have a CT scan of your chest, abdomen, and pelvis to see if the cancer shrunk enough to be removed with surgery. Contrast will be injected into your vein and will be given to you as a liquid to drink.

If the tumor shrunk enough, you may be approved for surgery. While surgery is the treatment option preferred by NCCN experts, another option is to start supportive care.

If the tumor didn't shrink enough, or if the cancer has spread to areas far from the stomach (metastasized), supportive care is an option. Supportive care is addressed in the next section, "Metastatic stomach cancer."

The tumor can't be removed with surgery

If you are healthy enough for major surgery but your doctors don't think surgery will be successful, you have other treatment options:

- Chemoradiation to try to cure the cancer. This is called *definitive chemoradiation*. The recommended chemotherapy regimens for definitive chemoradiation are listed in [Guide 6](#).
- Systemic therapy. See Guides 11 and 12 in the next section, "Metastatic stomach cancer," for the recommended systemic therapy regimens.

You're not healthy enough for (or you don't want) major surgery

If you are not approved for (or you decline) surgery, the cancer is managed as metastatic disease. See the next section, "Metastatic cancer," for information.

Guide 4. Chemotherapy regimens for before and after surgery (perioperative)

Medicines included in regimen	
Preferred regimens	A fluoropyrimidine and oxaliplatin
	Fluorouracil, leucovorin, oxaliplatin, and docetaxel (FLOT)
Other recommended regimen	Fluorouracil and cisplatin

Guide 5. Chemotherapy regimens for preoperative chemoradiation

Medicines included in regimen	
Preferred regimens	Fluorouracil and oxaliplatin
	Fluorouracil and cisplatin
	A fluoropyrimidine (fluorouracil or capecitabine) and paclitaxel
Other recommended regimen	Paclitaxel and carboplatin

Guide 6. Chemotherapy regimens for definitive chemoradiation

Medicines included in regimen	
Preferred regimens	Fluorouracil and oxaliplatin
	Fluorouracil and cisplatin
	A fluoropyrimidine (fluorouracil or capecitabine) and paclitaxel

Your first treatment was surgery

The results of surgery are used to decide if more treatment is needed. Possible results of surgery include:

- No cancer is in the surgical margin, or
- Cancer is in the surgical margin, or
- Not all the cancer that the surgeon could see in or near the stomach was removed, or
- Cancer has spread to distant sites (metastasized).

These four possible results of surgery are discussed in more detail next.

No cancer is in the surgical margin

When the surgical margin is cancer-free, options are also based on the pathologic (post-surgery) stage. No more treatment is needed if the tumor is very small (a Tis or T1 tumor). The next step is to start follow-up care.

T2 tumors have invaded the third layer of the stomach wall. Whether more treatment is needed after surgery depends on the risk of the cancer returning. The cancer is more likely to return if:

- The cancer cells look very different from normal cells under a microscope, or
- Cancer has spread into lymphatic spaces or nerves,
- You are younger than 50 years of age, or
- D2 lymph nodes weren't removed.

If you are at high risk of the cancer returning, treatment is recommended. The recommended treatment is chemotherapy, then chemoradiation, then more chemotherapy (all fluoropyrimidine-based).

Even when the margin is cancer-free, treatment after surgery is always recommended for certain stomach cancers. This includes T3 or T4 tumors, regardless of whether there is cancer in any lymph nodes.

Treatment is also recommended if cancer was found in one or more lymph nodes, regardless of the tumor stage. Treatment of both of these situations depends on whether you had a lot of lymph nodes removed (called a D2 dissection) during surgery. D2 lymph nodes include those next to nearby arteries and the spleen.

If you had a D2 lymph node dissection, chemotherapy is recommended after surgery. The chemotherapy regimen recommended by NCCN experts includes capecitabine (Xeloda®) and oxaliplatin (Eloxatin®).

If you didn't have a D2 lymph node dissection during surgery, fluoropyrimidine-based chemoradiation is recommended. Chemotherapy with fluorouracil or capecitabine is given before and after the chemoradiation.

Guide 7 presents the options just discussed for treatment after surgery if no cancer was found in the surgical margin.

Cancer is in the surgical margin

If cancer is found in the surgical margin, fluoropyrimidine-based chemoradiation is recommended. Chemoradiation will treat any cancer that may remain in your body.

All visible cancer was not removed

If your surgeon wasn't able to remove all the cancer in or near your stomach, you have two options:

- Fluoropyrimidine-based chemoradiation, or
- Supportive care.

Cancer has spread far from the stomach

If cancer has metastasized, supportive care is recommended. It is addressed in the next section, "Metastatic stomach cancer."

You had chemotherapy or chemoradiation before surgery

If you had chemotherapy or chemoradiation before surgery, the results of surgery are used to decide if more treatment is needed. Possible results of surgery include:

- No cancer is in the surgical margin, or
- Cancer is in the surgical margin, or
- Not all the cancer that the surgeon could see in or near the stomach was removed, or
- Cancer has spread to distant sites (metastasized).

See Guide 8 for treatment options based on the results of surgery.

Guide 7. You had only surgery and no cancer was found in the surgical margin

Tumor stage	Cancer in lymph nodes?	What are my options?
Tis or T1	No	Watch-and-wait (no additional treatment)
T2	No	Option 1: Watch-and-wait (no additional treatment) Option 2: Chemotherapy, then chemoradiation, then more chemotherapy (all fluoropyrimidine-based). This option is for patients at high risk of the cancer returning.
T3 or T4	Yes or no	If you had a D2 lymph node dissection: Chemotherapy alone
Any	Yes	If you had a less extensive lymph node dissection: Chemotherapy, then chemoradiation, then more chemotherapy (all fluoropyrimidine-based)

Guide 8. Treatment after pre- or perioperative treatment and surgery

Surgical results	What are my options?
No cancer is in the surgical margin	Option 1: Watch-and-wait (if you had chemoradiation before surgery) Option 2: Chemotherapy alone (if you had chemotherapy alone before surgery). See Guide 6 for regimens.
Cancer is in the surgical margin	Option 1: Chemoradiation (only if you didn't have it before surgery) Option 2: Surgery to try to remove remaining cancer
Some cancer remains in or near your stomach	Option 1: Chemoradiation (only if you didn't have it before surgery) Option 2: Supportive care
Cancer is found in distant sites	See Guide 10 (Options for treating metastatic stomach cancer)

When treatment is over

Guide 9 presents the recommended follow-up care after stomach cancer treatment. Follow-up care is started when there are no signs of cancer after treatment.

Updates of your medical history and physical exams should be done regularly. Blood tests, CT scans, and upper endoscopy are only done when needed.

Due to surgery, you may not be getting enough nutrients. You should be tested for low vitamin B12, iron, and other levels. Treatment should be received as needed.

If cancer comes back

Cancer may return during follow-up care. This is called a recurrence. Cancer that returns near to where the stomach is (or was, if you had a total gastrectomy) located is called a *locoregional recurrence*. If cancer returns and spreads to areas far from the stomach region, it is metastatic disease.

Locoregional recurrence

Treating a locoregional recurrence depends in large part on two things:

- Whether you are healthy enough overall to undergo major surgery, and
- Whether your doctor thinks that the cancer can be successfully removed using surgery.

So, surgery may be an option if you are able and willing to have it. If you are not a good candidate for surgery, supportive care is an option. Supportive care is addressed in the next section, "Metastatic stomach cancer."

Metastatic recurrence

If cancer returns to areas of the body far from where the stomach is (or was) located, supportive care is the main treatment option. Supportive care is addressed in the next section, "Metastatic stomach cancer."



Supportive care

The goal of supportive care isn't to treat cancer, but to improve quality of life. It is also called palliative care. It can address many needs.

Supportive care can help with:

- ✓ Managing physical and emotional symptoms
- ✓ Making treatment decisions
- ✓ Coordinating care between health providers

Talk with your treatment team to plan the best supportive care for you.

Guide 9. Follow-up care and monitoring for the return of stomach cancer

T1b tumors treated with surgery

Follow-up care	How often?
Physical exam and updated medical history	Every 3–6 months for 1–2 years, every 6–12 months for 3–5 years, and annually thereafter
CBC and chemistry profile	As needed according to your doctor
Upper GI endoscopy	As needed according to your doctor
CT of your chest, abdomen, and pelvis	As needed according to your doctor
Monitoring for nutritional health including vitamin B12 and iron levels (if you had surgery)	Ongoing

Stages 2 and 3

Follow-up care	How often?
Physical exam and updated medical history	Every 3–6 months for 1–2 years, every 6–12 months for 3–5 years, and annually thereafter
CBC and chemistry profile	As needed according to your doctor
Upper GI endoscopy (if you had a partial or subtotal gastrectomy)	As needed according to your doctor
CT of your chest, abdomen, and pelvis	Every 6–12 months for first 2 years, then annually up to 5 years. Testing beyond 5 years as needed per your doctor.
Monitoring for nutritional health including vitamin B12 and iron levels (if you had surgery)	Ongoing

Metastatic stomach cancer

If cancer spreads to areas of the body far from the stomach, it is called metastatic cancer. Metastatic stomach cancer usually cannot be cured. Options for managing metastatic disease are based on your performance status, which is your ability to do everyday tasks and activities. Your doctor will rate your performance status using one of the two systems described next.

Eastern Cooperative Oncology Group (ECOG)

- A score of 0 means you are fully active.
- A score of 1 means you are able to do all self-care activities but are unable to do hard physical work.
- A score of 2 means you are able to do all self-care activities and spend most of waking time out of bed but you are unable to do any work.
- A score of 3 means you are unable to do most self-care activities and spend more than half of your time awake in a bed or a chair.
- A score of 4 means you are fully disabled.

Karnofsky Performance Status (KPS)

- A score of 0 to 49 means you are unable to care for yourself.
- A score of 50 to 79 means you are unable to work and some assistance is needed.
- A score of 80 to 100 means you are able to do your normal work and activities.

Guide 10 lists the options used to manage metastatic and other advanced cancers. The options are based on your performance status. People with a good performance status generally have more treatment options. This is because they are better able to tolerate cancer treatments, which can be harsh.

Poor performance status

If you have an ECOG score of 3 or 4, or a KPS score of 0 to 59, you are considered to have a poor performance status. This means that chemotherapy would likely be too harsh for you. Supportive care is the best way to manage metastatic disease if you can't have other treatment. See page 42 for information on supportive care.

Good performance status

If you have an ECOG score of 0, 1, or 2, or a KPS score of 60 to 100, you are considered to have a good performance status. This means you have more than one option for managing the cancer.

First steps

If you haven't already been tested for the following tumor markers, you should be tested now. Testing for these markers will be used to determine which systemic therapies you can have.

- HER2
- PD-L1
- Microsatellite instability (MSI) or mismatch repair deficiency (dMMR)

The treatment options for people with a good performance score include:

- Chemoradiation
- Systemic therapy
- Supportive care

Each of these options is discussed in more detail below.

Chemoradiation

Treatment with both radiation and chemotherapy is an option for people whose cancer cannot be removed with surgery and who haven't already

Guide 10. Options for treating metastatic stomach cancer

Performance status	What are my options?
ECOG score of 0, 1, or 2 or KPS score of 60 to 100	Option 1: Chemoradiation (if you haven't had it and surgery isn't an option) Option 2: Systemic therapy Option 3: Supportive care
ECOG score of 3 or 4 or KPS score of 0 to 59	Supportive care

had chemoradiation. The chemotherapy regimens recommended by NCCN experts to be used with radiation are listed below.

- Fluorouracil and oxaliplatin
- Fluorouracil and cisplatin
- A fluoropyrimidine (fluorouracil or capecitabine) and paclitaxel

Systemic therapy

Doctors use the term “systemic” when talking about a cancer treatment for the whole body. Chemotherapy is the most well known type of systemic therapy. NCCN experts recommend starting systemic therapy with one of the regimens listed in [Guide 11](#). These “first-line” regimens should be used first for advanced cancer because they have the best chance of working.

Targeted therapy is a newer type of systemic therapy. Trastuzumab (Herceptin®) is a targeted therapy used for treating advanced stomach cancers. It should be included in your first-line systemic therapy regimen if your cancer has too many HER2 receptors, but not if the regimen includes epirubicin (Ellence®).

Your doctor will choose a systemic therapy regimen based on your health and treatment side effects. Regimens consisting of two drugs have less severe side effects than three-drug regimens. If you are given fluorouracil (5-FU), leucovorin may be added to limit side effects of the chemotherapy. No matter what regimen you receive, you should be assessed for side effects on a regular basis.

[Guide 12](#) lists the regimens that are given if the cancer doesn't respond to first-line regimens. The regimen that is best for you depends on your prior treatment and performance status.

The regimens listed as “preferred” in Guides 11 and 12 have been shown within well-designed clinical trials to control cancer growth better than other treatments.

Supportive care

Supportive care is also an option for people with a good performance status, and can be given with either of the above treatments. More information on supportive care is provided on page 42.

Guide 11. Systemic therapy regimens to try first

Medicines included in regimen	
Preferred regimens	A fluoropyrimidine (fluorouracil or capecitabine) and oxaliplatin
	A fluoropyrimidine (fluorouracil or capecitabine) and cisplatin
Other recommended regimens	Paclitaxel with cisplatin or carboplatin
	Docetaxel with cisplatin
	A fluoropyrimidine (fluorouracil or capecitabine)
	Docetaxel
	Paclitaxel
	Fluorouracil and irinotecan
	Docetaxel, cisplatin, and fluorouracil
	Docetaxel, oxaliplatin, and fluorouracil
	Docetaxel, carboplatin, and fluorouracil
	ECF (epirubicin, cisplatin, and fluorouracil)
	Epirubicin, oxaliplatin, and fluorouracil
	Epirubicin, cisplatin, and capecitabine
Epirubicin, oxaliplatin, and capecitabine	

If your cancer has too many HER2 receptors, the targeted therapy medicine trastuzumab (Herceptin[®]) should be added to first-line chemotherapy. But, it should not be added to regimens that include epirubicin (Elevance[®]).

Supportive care

The goal of supportive care is to prevent and relieve discomfort caused by cancer, its symptoms, or its treatment. Supportive care may also extend life, improve your eating, and help you feel better overall.

People with nonmetastatic cancer also receive supportive care. Other aspects of supportive care, such as symptom control, are useful for many people with any stage of stomach cancer. The major symptoms caused by stomach cancer are described next.

Guide 12. If the cancer doesn't respond to first-line regimens

Medicines included in regimen	
Preferred regimens	Ramucirumab and paclitaxel
	Docetaxel
	Paclitaxel
	Irinotecan
	Trifluridine and tipiracil (for third-line or subsequent therapy)
	Fluorouracil and irinotecan
	Pembrolizumab (for second-line or subsequent therapy for MSI-H or dMMR tumors)
Other recommended regimens	Ramucirumab
	Irinotecan and cisplatin
	Pembrolizumab (for third-line or subsequent therapy in people with the PD-L1 biomarker)
	Docetaxel and irinotecan

Bleeding

One of the most common symptoms among people with stomach cancer is bleeding. Bleeding may be caused by the cancer itself, or by its treatment.

- Endoscopic treatment may be used to stop bleeding. While endoscopic treatment may work at first, often bleeding returns in time. More research is needed to learn how well endoscopic treatment works.
- Embolization may be used to close up or block blood vessels in situations where endoscopy is not helpful or bleeding occurs.
- Some research supports use of external beam radiation therapy (EBRT) to control bleeding.

EBRT stops both recent and ongoing blood loss.

- Proton pump inhibitors can be prescribed to reduce the risk of bleeding. However, it is unclear how well they work. More research is needed.

Pain

Pain caused by stomach cancer or its treatment can be controlled with radiation therapy, chemotherapy, pain medication, and other methods.

Nausea and vomiting

There are medicines and other methods that may help stop nausea and vomiting. Treatment for these symptoms is based on whether they are caused by a

tumor blocking your gut. Read the next section, "GI blockage," to learn more.

GI blockage

The cancer may block food and liquids from passing through your stomach and intestines. If your doctor thinks there is a blockage (obstruction), you will need to be tested. An endoscope may be inserted down your throat and into your stomach so your doctor can see. Another option is to swallow a contrast dye while being x-rayed. The x-rays are used to create a live video of the inside of your stomach. This is called a fluoroscopic assessment.

The primary goals of caring for patients with a gastric obstruction are to reduce nausea and vomiting and, when possible, allow you to go back on an oral diet.

The following methods are used to try to alleviate or bypass the obstruction.

- **Endoscopy.** This involves placement of a thin metal stent while you are sedated. The stent may be placed in the opening between your esophagus and stomach or in the opening between your stomach and small intestine. The stent will expand in the opening and remain in your body to allow food to pass through.
- **Surgery.** A surgery called a *gastrojejunostomy bypass* involves putting a long tube through your abdomen and into your small intestine. This allows you to receive liquid food directly into the intestines. In some patients, surgery may be needed to remove all or part of the stomach. This is called a *gastrectomy*.
- **External beam radiation therapy (EBRT)**
- **Chemotherapy**

If the obstruction cannot be alleviated or bypassed, the main goal is to reduce the symptoms of obstruction using *gastrostomy*. A gastrostomy

involves putting a tube through the abdomen and directly into the stomach. The tube can be used for giving liquids, liquid food, and medicines. It also allows air and fluid to leave the stomach.

Review

- Endoscopic resection is a treatment option for early stomach cancers that haven't grown beyond the first layer of the stomach wall.
- If you are able and willing to have surgery, gastrectomy with lymph node dissection is also an option for treating early stomach cancer.
- If a stomach tumor grows beyond the first layer of the stomach wall (the mucosa), it is called locoregional cancer. There may be cancer in nearby lymph nodes, but not in areas far from the stomach.
- Surgery may be a treatment option for locoregional stomach cancer. If you are medically able to tolerate major surgery, whether you can have surgery also depends on the location and extent of the cancer.
- If cancer spreads to areas of the body far from the stomach, it is called metastatic cancer. Metastatic stomach cancer usually cannot be cured.
- Options for managing metastatic stomach cancer are based on your performance status, which is your ability to do everyday tasks and activities.

5

Survivorship

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Stomach cancer survivors have special long-term needs after finishing treatment. Survivorship focuses on the physical, emotional, and financial issues unique to cancer survivors. Managing the long-term side effects of cancer, staying connected with your primary care doctor, and living a healthy lifestyle are important parts of survivorship.

Your primary care doctor

After finishing cancer treatment, your primary care doctor will play an important role in your care. Your cancer doctor and primary doctor should work together to make sure you get the follow-up care you need. Your oncologist should develop a survivorship care plan that includes:

- A summary of all cancer-related treatment you've had, including surgeries, chemotherapy, and radiation therapy
- A description of the late- and long-term side effects of stomach cancer and its treatment
- Recommendations for monitoring for the return of cancer
- Information on when your care will be transferred to your primary care physician. The plan should also outline specific responsibilities for both your cancer doctor and your primary care doctor.
- Recommendations on your overall health and well-being.

Did you know?

Stomach cancer survivors who had a total gastrectomy are at particular risk for long-term health issues compared to people who had a partial gastrectomy. There are ways to help manage many of these issues. Your cancer doctor and your primary care doctor can help.

Healthy habits

Monitoring for the return of cancer is important after finishing treatment. But it is also important to keep up with other aspects of your health. Steps you can take to help prevent other health issues and to improve your quality of life are listed below.

- Get screened for other types of cancer. Your primary care doctor should tell you what cancer screening tests you should have based on your gender, age, and risk level.
- Get other recommended health care for your age and gender, such as blood pressure screening, hepatitis C screening, and immunizations (such as the flu shot).
- Try to exercise at moderate intensity for at least 30 minutes most days of the week.
- Eat a healthy diet with lots of plant-based foods, including vegetables, fruits, and whole grains.

- Drink little to no alcohol. This means no more than 1 drink per day for women, and no more than 2 drinks per day for men.
- If you are a smoker, quit! Your doctor will be able to provide (or refer you for) counseling on how to stop smoking.

Managing long-term side effects

Common issues facing stomach cancer survivors and how they can be managed are described next.

Weight loss

Your doctor should monitor your weight on a regular basis to make sure you're maintaining a healthy weight. Eating smaller, more frequent meals throughout the day and not drinking fluids with meals can help prevent weight loss.

Fatigue

Staying active can help lessen tiredness and fatigue. Keep in mind, however, that it is important to know your limits and rest when you need to.

Diarrhea

Taking anti-diarrheal medications and increasing your fiber intake can help alleviate diarrhea.

Chemotherapy-induced neuropathy

A medicine called duloxetine (Cymbalta®) is an option for treating nerve pain caused by chemotherapy. Duloxetine is not helpful, however, for treating numbness or tingling.

Osteopenia/osteoporosis

Low bone density is another common long-term side effect in stomach cancer survivors. It is caused by not getting enough vitamin D, calcium, phosphorus, and other vitamins and minerals. Taking vitamin D

Figure 9

Experts recommend eating a healthy diet, especially one that includes a lot of plant-based foods (veggies, fruits, and whole grains).



Figure 10

Cutting back on alcohol is an important part of staying healthy. Experts recommend no more than 1 drink per day for women, and no more than 2 drinks per day for men.



supplements can improve bone health. Your bone density should be checked on a regular basis.

Indigestion

Stomach cancer survivors who underwent gastrectomy often have indigestion. Try to avoid foods that increase acid production, such as citrus fruits, tomato sauce, and spicy foods. Caffeine, peppermint, and chocolate can also cause indigestion and should be avoided if possible. A type of medicine called a proton pump inhibitor may also be helpful.

Nutritional deficiencies

Long-term anemia, iron deficiency, and vitamin B12 deficiency are common in patients treated with gastrectomy for gastric cancer. Taking vitamin B12 and iron supplements is a safe and effective way to help reverse these deficiencies. If needed, your doctor may refer you to a dietician or nutritionist for individualized counseling.

Dumping syndrome

People who have had a total gastrectomy may experience a side effect called dumping syndrome. Dumping syndrome occurs when the contents of the stomach empty into the small intestine too quickly. This may happen shortly after eating a meal (early dumping syndrome) or within 2–3 hours of eating (late dumping syndrome).

Symptoms of early dumping syndrome include palpitations, diarrhea, nausea, and cramps. Late dumping syndrome tends to cause dizziness, hunger, cold sweats, and faintness.

To help manage the symptoms of dumping syndrome, NCCN experts recommend eating frequently throughout the day, avoiding fluid intake with meals, and consuming a diet high in protein and fiber and low in simple carbohydrates and sugars.

Review

- ▶ Survivorship focuses on the physical, emotional, and financial issues unique to cancer survivors.
- ▶ After cancer treatment, your cancer doctor and primary doctor should work together to make sure you get the follow-up care you need.
- ▶ A survivorship care plan is helpful in transitioning your care to your primary care doctor.
- ▶ Healthy habits, including exercising and eating right, play an important role in helping to prevent other diseases and second cancers.
- ▶ Common long-term side effects facing stomach cancer survivors include weight loss, fatigue, indigestion, and dumping syndrome.

6

Making treatment decisions

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Having cancer is very stressful. While absorbing the fact that you have cancer, you have to learn about tests and treatments. In addition, the time you have to accept a treatment plan feels short. This chapter aims to help you make decisions that are in line with your beliefs, wishes, and values.

It's your choice

The role patients want in choosing their treatment differs. You may feel uneasy about making treatment decisions. It may be hard to hear or know what others are saying. This may be due to a high level of stress. Stress, pain, and drugs can limit your ability to make good decisions. You may feel uneasy because you don't know much about cancer. You've never heard the words used to describe cancer, tests, or treatments. Likewise, you may think that your judgment isn't any better than your doctors'.

Your doctors will give you the information you need to make an informed choice. In early-stage disease, there are often multiple good options. It is good news to have multiple options.

Letting others decide which option is best may make you feel more at ease. But, whom do you want to make the decisions? You may rely on your doctors alone to make the right decisions. However, your doctors may not tell you which to choose if you have multiple good options. You can also have loved ones help. They can gather information, speak on your behalf, and share in decision-making with your doctors. Even if others decide which treatment you will receive, you still have to agree by signing a consent form.

On the other hand, you may want to take the lead or share in decision-making. Most patients do. In shared decision-making, you and your doctors share information, weigh the options, and agree on a treatment plan. Your doctors know the science behind your plan, but you know your concerns and goals. By working together, you are likely to get a higher quality of care and be more satisfied. You'll likely get the treatment you want, at the place you want, and by the doctors you want.

Questions to ask your doctors

You will likely meet with experts from different fields of medicine. Strive to have helpful talks with each person. Prepare questions before your visit and ask questions if the person isn't clear. Bring a pad of paper to take notes. You can also record your talks and get copies of your medical records. It may be helpful to have family members or friends with you at these visits. A patient advocate or navigator might also be able to come. They can help to ask questions and remember what was said. Suggested questions to ask are included on the following pages.

What's my diagnosis and prognosis?

It's important to know that there are different types of cancer. Cancer can greatly differ even when people have a tumor in the same organ. Based on your test results, your doctors can tell you which type of cancer you have. He or she can also give a prognosis. A prognosis is a prediction of the pattern and outcome of a disease. Knowing the prognosis may affect what you decide about treatment.

1. Where did the cancer start? In what type of cell?
2. Is this cancer common?
3. What is the cancer stage? Does this stage mean the cancer has spread far?
4. Is this a fast- or slow-growing cancer?
5. Do I have hereditary stomach cancer? Should my family and I receive genetic counseling?
6. What other test results are important to know?
7. How often are these tests wrong?
8. Would you give me a copy of the pathology report and other test results?
9. Can the cancer be cured? If not, how well can treatment stop the cancer from growing?

What are my options?

There is no single treatment practice that is best for all patients. There is often more than one treatment option along with clinical trial options. Your doctor will review your test results and recommend treatment options.

1. What will happen if I do nothing?
2. Can I just carefully monitor the cancer?
3. Do you consult NCCN recommendations when considering options?
4. Are you suggesting options other than what NCCN recommends? If yes, why? From what source are these options based?
5. How do my age, health, and other factors affect my options?
6. Which option is proven to work best?
7. Which options lack scientific proof?
8. What are the benefits of each option? Does any option offer a cure? Are my chances any better for one option than another? Which option spares the most healthy tissue? Is any option less invasive? Less time-consuming? Less expensive?
9. What are the risks of each option? What are possible complications? What are the rare and common side effects? Short-lived and long-lasting side effects? Serious or mild side effects? Other risks?
10. What can be done to prevent or relieve the side effects of treatment?
11. What are my chances that the cancer will return?

What does each option require of me?

Many patients consider how each option will practically affect their lives. This information may be important because you have family, jobs, and other duties to take care of. You also may be concerned about getting the help you need. If you have more than one option, choosing the option that is the least taxing may be important to you:

1. Will I have to go to the hospital or elsewhere? How often? How long is each visit?
2. Do I have a choice of when to begin treatment? Can I choose the days and times of treatment?
3. How do I prepare for treatment? Do I have to stop taking any of my medicines? Are there foods I will have to avoid?
4. Should I bring someone with me when I get treated?
5. Will the treatment hurt?
6. How much will the treatment cost me? What does my insurance cover?
7. Will I miss work or school? Will I be able to drive?
8. Is home care after treatment needed? If yes, what type?
9. How soon will I be able to manage my own health?
10. When will I be able to return to my normal activities?

Weighing your options

Deciding which option is best can be hard. Doctors from different fields of medicine may have different opinions on which option is best for you. This can be very confusing. Your spouse or partner may disagree with which option you want. This can be stressful. In some cases, one option hasn't been shown to work better than another, so science isn't helpful. Some ways to decide on treatment are discussed next.

Second opinion

The time around a cancer diagnosis is very stressful. People with cancer often want to get treated as soon as possible. They want to make their cancer go away before it spreads farther. While cancer can't be ignored, there is time to think about and choose which option is best for you.

You may wish to have another doctor review your test results and suggest a treatment plan. This is called getting a second opinion. You may completely trust your doctor, but a second opinion on which option is best can help.

Copies of the pathology report, a DVD of the imaging tests, and other test results need to be sent to the doctor giving the second opinion. Some people feel uneasy asking for copies from their doctors. However, a second opinion is a normal part of cancer care.

When doctors have cancer, most will talk with more than one doctor before choosing their treatment. What's more, some health plans require a second opinion. If your health plan doesn't cover the cost of a second opinion, you have the choice of paying for it yourself.

If the two opinions are the same, you may feel more at peace about the treatment you accept to have. If the two opinions differ, think about getting a third

opinion. A third opinion may help you decide between your options. Choosing your cancer treatment is a very important decision. It can affect your length and quality of life.

Support groups

Besides talking to health experts, it may help to talk to patients who have walked in your shoes. Support groups often consist of people at different stages of treatment. Some may be in the process of deciding while others may be finished with treatment. At support groups, you can ask questions and hear about the experiences of other people with stomach cancer.

Compare benefits and downsides

Every option has benefits and downsides. Consider these when deciding which option is best. Talking to others can help pinpoint benefits and downsides you haven't thought of. Scoring each factor from 0 to 10 can also help since some factors may be more important to you than others.

Websites

American Cancer Society

www.cancer.org/cancer/stomachcancer/index

Debbie's Dream Foundation: Curing Stomach Cancer

www.DebbiesDream.org

Hope for Stomach Cancer

<https://stocan.org>

National Cancer Institute

www.cancer.gov/types/stomach

National Coalition for Cancer Survivorship

www.canceradvocacy.org/toolbox

NCCN

www.nccn.org/patients

No Stomach For Cancer

www.nostomachforcancer.org

Review

- ▶ Shared decision-making is a process in which you and your doctors plan treatment together.
- ▶ Asking your doctors questions is vital to getting the information you need to make informed decisions.
- ▶ Getting a second opinion, attending support groups, and comparing benefits and downsides may help you decide which treatment is best for you.



Words to know

abdomen

The belly area between the chest and pelvis.

adenocarcinoma

Cancer of cells that form glands and produce mucus.

biopsy

Removal of small amounts of tissue or fluid to be tested for disease.

cancer stage

A rating of the growth and spread of cancer.

chemoradiation

Treatment that combines chemotherapy with radiation therapy.

chemotherapy

Drugs that stop the life cycle of cells so they don't increase in number.

clinical stage

Rating the extent of a tumor based on tests before treatment.

clinical trial

Research on a test or treatment to assess its safety or how well it works.

complete blood count (CBC)

A test of the number of blood cells.

comprehensive chemistry profile

A panel of tests that gives information about the health and functions of the kidneys and the liver. Usually ordered as part of a comprehensive metabolic panel (CMP).

computed tomography (CT)

A test that uses x-rays to view body parts.

contrast

A dye put into your body to make clearer pictures during imaging tests.

digestive system

A set of organs that breaks down food for the body to use.

ECOG (Eastern Cooperative Oncology Group) Performance Scale

A rating scale of one's ability to do daily activities.

endoscope

A thin, long tube fitted with tools that is guided down the mouth.

endoscopic mucosal resection (EMR)

Removal of early tumors with a snare that has been guided down the throat.

endoscopic resection

Treatment that removes early tumors with a tool guided down the throat.

endoscopic submucosal dissection (ESD)

Removal of early tumors with a special knife that has been guided down the throat.

endoscopic ultrasound (EUS)

A device guided down your throat to make pictures using sound waves.

epithelium

Tissue that lines the stomach wall.

esophagoduodenoscopy (EGD)

Use of a thin tool guided down the throat into the esophagus and stomach. Also called an upper GI endoscopy.

esophagogastric junction (EGJ)

The area where the esophagus and stomach join.

esophagus

The tube-shaped organ between the throat and stomach.

external beam radiation therapy (EBRT)

Radiation therapy received from a machine outside the body.

fine-needle aspiration (FNA)

Removal of a tissue sample with a small needle.

gastrectomy

A surgery that removes some or all of the stomach.

gastroenterologist

A doctor who's an expert in digestive diseases.

human epidermal growth factor receptor 2 (HER2)

A protein on the edge of a cell that sends signals for the cell to grow.

jejunostomy tube (J-tube)

A feeding tube that is inserted through a cut into the intestine.

Karnofsky Performance Status (KPS)

A rating scale of one's ability to do daily activities.

lamina propria

Connective tissue within the mucosa of the stomach wall.

laparoscopy

Use of a thin tool inserted through a cut made into the belly area.

lymph

A clear fluid containing white blood cells.

lymph node

A small group of special disease-fighting cells located throughout the body.

lymph node dissection

A type of surgery that removes some disease-fighting structures called lymph nodes.

medical oncologist

A doctor who's an expert in cancer drugs.

mucosa

The first, inner layer of the stomach wall.

muscularis mucosae

A thin layer of muscle separating the mucosa from the submucosa of the stomach wall.

muscularis propria

The third layer of the stomach wall made mostly of muscle.

pathologic stage

A rating of the extent of cancer based on microscopic review after treatment.

pathologist

A doctor who's an expert in examining tissue and cells to find disease.

pelvis

The area of the body between the hip bones.

positron emission tomography-computed tomography (PET/CT)

A test that uses radioactive material and x-rays to see the shape and function of body parts.

primary treatment

The main treatment used to rid the body of cancer.

radiation oncologist

A doctor who's an expert in radiation treatment.

radiation therapy

The use of radiation to treat cancer.

recurrence

The return of cancer after treatment.

serosa

The outer layer of the stomach wall that makes fluid so that organs can slide against one another. Also called the visceral peritoneum.

small intestine

The digestive organ that absorbs nutrients from eaten food.

submucosa

The second layer of the stomach wall made mostly of connective tissue.

subserosa

A thin layer of connective tissue within the wall of the stomach.

supportive care

Treatment for symptoms of a disease.

surgical margin

The normal tissue around the tumor removed during surgery.

surgical oncologist

A surgeon who's an expert in performing surgical procedures in cancer patients.

targeted therapy

Drugs that stop the growth process specific to cancer cells.

upper endoscopy

Use of a thin tool guided down the throat into the esophagus and stomach. Also called esophagogastroduodenoscopy (EGD).

vascular endothelial growth factor receptor (VEGFR)

A molecule that binds to cells that form blood vessels.

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Abramson Cancer Center
at the University of Pennsylvania
Philadelphia, Pennsylvania
800.789.7366
penmedicine.org/cancer

Fred & Pamela Buffett Cancer Center
Omaha, Nebraska
800.999.5465
nebraskamed.com/cancer

Case Comprehensive Cancer Center/
University Hospitals Seidman Cancer
Center and Cleveland Clinic Taussig
Cancer Institute
Cleveland, Ohio
800.641.2422 • UH Seidman Cancer Center
uhhospitals.org/services/cancer-services
866.223.8100 • CC Taussig Cancer Institute
my.clevelandclinic.org/departments/cancer
216.844.8797 • Case CCC
case.edu/cancer

City of Hope National Medical Center
Los Angeles, California
800.826.4673
cityofhope.org

Dana-Farber/Brigham and
Women's Cancer Center
Massachusetts General Hospital
Cancer Center
Boston, Massachusetts
877.332.4294
dfbwc.org
massgeneral.org/cancer

Duke Cancer Institute
Durham, North Carolina
888.275.3853
dukecancerinstitute.org

Fox Chase Cancer Center
Philadelphia, Pennsylvania
888.369.2427
foxchase.org

Huntsman Cancer Institute
at the University of Utah
Salt Lake City, Utah
877.585.0303
huntsmancancer.org

Fred Hutchinson Cancer
Research Center/Seattle
Cancer Care Alliance
Seattle, Washington
206.288.7222 • seattlecca.org
206.667.5000 • fredhutch.org

The Sidney Kimmel Comprehensive
Cancer Center at Johns Hopkins
Baltimore, Maryland
410.955.8964
hopkinskimmelfcancercenter.org

Robert H. Lurie Comprehensive
Cancer Center of Northwestern
University
Chicago, Illinois
866.587.4322
cancer.northwestern.edu

Mayo Clinic Cancer Center
Phoenix/Scottsdale, Arizona
Jacksonville, Florida
Rochester, Minnesota
800.446.2279 • Arizona
904.953.0853 • Florida
507.538.3270 • Minnesota
mayoclinic.org/cancercenter

Memorial Sloan Kettering
Cancer Center
New York, New York
800.525.2225
mskcc.org

Moffitt Cancer Center
Tampa, Florida
800.456.3434
moffitt.org

The Ohio State University
Comprehensive Cancer Center -
James Cancer Hospital and
Solove Research Institute
Columbus, Ohio
800.293.5066
cancer.osu.edu

O'Neal Comprehensive
Cancer Center at UAB
Birmingham, Alabama
800.822.0933
uab.edu/onealcancercenter

Roswell Park Comprehensive
Cancer Center
Buffalo, New York
877.275.7724
roswellpark.org

Siteman Cancer Center at Barnes-
Jewish Hospital and Washington
University School of Medicine
St. Louis, Missouri
800.600.3606
siteman.wustl.edu

St. Jude Children's Research Hospital
The University of Tennessee
Health Science Center
Memphis, Tennessee
888.226.4343 • stjude.org
901.683.0055 • westclinic.com

Stanford Cancer Institute
Stanford, California
877.668.7535
cancer.stanford.edu

UC San Diego Moores Cancer Center
La Jolla, California
858.657.7000
cancer.ucsd.edu

UCSF Helen Diller Family
Comprehensive Cancer Center
San Francisco, California
800.689.8273
cancer.ucsf.edu

University of Colorado Cancer Center
Aurora, Colorado
720.848.0300
coloradocancercenter.org

University of Michigan
Rogel Cancer Center
Ann Arbor, Michigan
800.865.1125
rogelcancercenter.org

The University of Texas
MD Anderson Cancer Center
Houston, Texas
800.392.1611
mdanderson.org

University of Wisconsin
Carbone Cancer Center
Madison, Wisconsin
608.265.1700
uwhealth.org/cancer

Vanderbilt-Ingram Cancer Center
Nashville, Tennessee
800.811.8480
vicc.org

Yale Cancer Center/
Smilow Cancer Hospital
New Haven, Connecticut
855.4.SMILOW
yalecancercenter.org

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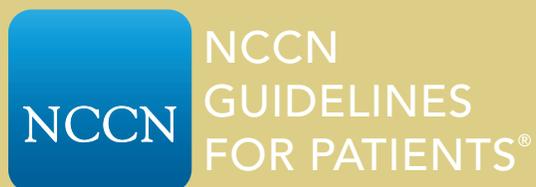
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Stomach Cancer

2019

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